SOUTH CAROLINA

—

INFRASTRUCTURE STUDY

MAY 1997

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—

PROJECTIONS OF STATEWIDE INFRASTRUCTURE COSTS, SAVINGS, AND FINANCING ALTERNATIVES 1995–2015

STATE OF SOUTH CAROLINA
STATE BUDGET AND CONTROL BOARD
ADVISORY COMMISSION ON INTERGOVERNMENTAL RELATIONS

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EXECUTIVE SUMMARY

The state of South Carolina has done what few states are willing to do: It has looked at the costs of growth twenty years into the future. What has it found? Very simply—growth, although good—is not inexpensive. Infrastructure (roads, bridges, water/sewer lines, utilities, public service buildings, public safety buildings, public recreational buildings, and public works facilities) costs money—money to construct, to rehabilitate, and to maintain. Further, since infrastructure is believed to be for the most part both expandable and indestructible, very rarely is it adequately provided, and almost never is it sufficiently maintained and rehabilitated. Thus, reflective of the above, infrastructure is often made more expensive by the sins of previous generations and, accordingly it is a costly catch-up game that never seems to be won.

Not only has the state of South Carolina calculated infrastructure needs, more importantly it has also looked at ways to reduce this need. This is done by providing infrastructure in more efficient ways, by allowing technology to replace outmoded delivery systems and materials, and through the sharing of infrastructure.

Another way of reducing infrastructure need and cost is to change the way the state is growing. This does not mean that growth should be halted; indeed, growth in all parts of the state is linked to higher qualities of life. It does mean that growth should be less spread out and should be located closer to already existing development and infrastructure.

Yet another way of reducing costs is to be knowledgeable about costs in advance of their occurrence by having a centralized agency coordinate infrastructure requirements and project future needs. This agency would be cognizant of what state departments are doing as well as the activities of regional Councils of Governments, counties and cities. This agency would also inform the public about the infrastructure needed to accommodate new growth and about the statewide obligation to keep the costs of infrastructure down.

What is the upside of what has been done here, and is there a downside? The upside is knowledge and the ability to plan and save for future needs. This includes detailed projections by nearly thirty categories of infrastructure. The upside is also choice: the ability to be more efficient about future growth and to pass on these savings to future generations of citizens of the state. The downside is that the numbers are daunting, and so may be ignored. Further, revenues must be earmarked from conventional sources or raised from other sources to pay for this need. But when the upside is compared to the downside, the choice is clear: *Infrastructure need must be specified, understood, and addressed.*

Without infrastructure in place, South Carolina cannot grow. This path-breaking study of the infrastructure needs of the state informs South Carolinians of the whys and wherefores of future growth-related capital spending. It clearly tells all citizens what infrastructure is needed, how much it will cost, and how other states have paid for it.

GROWTH IN SOUTH CAROLINA

South Carolina is one of the fastest-growing states in the United States. The state's 1995 population of 3.7 million and job base of 1.6 million has increased by one-third and one-half, respectively, since 1970. In the next twenty years these numbers will increase by another 23 and 30 percent. By the year 2015, the state will have a population of over 4.5 million and a job base of 2.1 million. South Carolina is the tenth fastest-growing state in the nation and the fifth fastest-growing state in the South. This indicates that the state is rapidly developing and, as well, that significant competition for growth exists within the region. Three-quarters of the growth will take place in the state's established regions. The Appalachian Region will be the growth leader, at double the growth of the next fastest-growing region (Midlands), followed by the Berkeley-Charleston-Dorchester, Waccamaw, and Catawba Regions. At about two-thirds the level of growth of the latter regions are the Lower Savannah and Lowcountry Regions. Trailing at one-third of these levels are Santee Lynches, Upper Savannah, and Pee Dee Regions.

South Carolina attracted $5.4 billion in nonresidential development investments in 1995, exceeding the previous yearly record by 45 percent. The jobs emerging from this growth paid an average wage of $28,500—$6,000 higher than the state average and $2,000 higher than the national average.

Premier international companies such as BMW, Hoffman-LaRoche, Amoco Chemical, Nucor, Michelin, and Fuji now call South Carolina home. With a strong and stable business climate, the state has become competitive as a center for regional and corporate headquarters. This is evidenced in Greenville-Spartanburg, Columbia, and Charleston. Tourism, too, is a pillar of the state's economy. Myrtle Beach, Charleston and Hilton Head are internationally recognized tourist destinations.

As of February 1997, South Carolina has more than 1,000 prime industrial sites ready to be developed and 250 spec-built buildings ready to be occupied. Counties in the state will issue 15,000 new residential building permits this year.

This development can draw on 16,000 megawatts of state electricity, 33 billion gallons of waterflow per day, and 160,000 miles of fiber optics. Eighty percent of the United States's population and retail sales are within 1,000 miles of Columbia, South Carolina.

INFRASTRUCTURE NEED

Infrastructure need in the state of South Carolina will be close to $57 billion for the period 1995 to 2015. About 58 percent ($33 billion) of this need is related to new growth, 25 percent ($14 billion) to ongoing rehabilitation (repair of existing and added infrastructure), and 17 percent ($10 billion) to backlog (various projects that should be completed).

This $57 billion of need for a twenty-year period encompasses twenty-eight categories of infrastructure that range from roads to libraries. These are grouped into seven larger categories which comprise the following percentages of need:

Transportation	(51%)	$28.8 billion
Commerce	(7%)	$3.9 billion
Public Safety, Administration/Welfare	(5%)	$2.6 billion
Education	(18%)	$10.2 billion
Health	(14%)	$7.8 billion
Recreation and Culture	(2%)	$1.5 billion
Environment	(3%)	$1.9 billion

Given the above, it is clear that half of all infrastructure need is in transportation, one-third is in education and health, and one-sixth is in the sum of the remaining categories of: commerce, public safety/ administration/welfare, environment, and recreation/culture.

SAVING INFRASTRUCTURE COSTS: TECHNOLOGY RELATED

Infrastructure costs can be reduced by providing infrastructure in alternative ways, improving technology, and sharing infrastructure.

I. Alternatives to Traditional Construction/Approaches
Savings based upon:

A) New construction management techniques: **$2.863 billion**
B) Privatization and public-private partnerships: **$2.333 billion**
C) Zoning/building code and other regulatory modifications: **$1.334 billion**
D) Modularization and standardization: **$1.331 billion**
E) Improved maintenance programs: **$1.268 billion**
F) Reduction or elimination of infrastructure demand: **$0.680 billion**
G) Substitution of construction materials: **$0.519 billion**

II. Technological Advances
Savings based upon:

A) Continuing computerization and the telecommunications revolution: **$1.208 billion**
B) New composite materials: **$1.178 billion**
C) New mechanical devices: **$0.502 billion**
D) Use of new power supplies: **$0.258 billion**
E) Environmental remediation: **$0.075 billion**

III. Regionalization, or Sharing of Resources
Savings based upon:

A) Enhanced effectiveness of existing infrastructure and programs: **$0.232 billion**
B) Reduction of duplicative infrastructure: **$0.270 billion**

TOTAL SAVINGS **$13.906 billion**

SAVING INFRASTRUCTURE COSTS: COSTS OF SPRAWL SAVINGS

Infrastructure costs can also be saved by channeling growth closer to where growth has already taken place or to rural centers where new growth can be more efficiently serviced. Growth management enables all projected growth to take place but in a way that conserves resources because lands are not skipped over and infrastructure underutilized.

Savings of **$2.7 billion** can be realized by developing near existing neighborhoods for traditional suburban development and in predesignated peripheral centers for rural development.

The above two sources of savings amount to about **$16.7 billion** that, when subtracted from **$56.7 billion**, amounts to **$40 billion** to be raised over 20 years, or **$2 billion** per year.

REVENUES TO SERVE INFRASTRUCTURE NEEDS: WHAT IS THERE? WHAT MUST BE RAISED?

About three-quarters of future infrastructure needs of $2.0 billion per year for 20 years (after savings) can be met from current sources of state/local general revenues from federal, state, and intergovernmental transfers.

Another one-quarter of the revenues can be raised from other revenue sources or a portion of infrastructure need defined.

A list of potential sources of revenue and their projected revenues is included in the Infrastructure Study.

AN INFRASTRUCTURE BUSINESS PLAN FOR THE STATE OF SOUTH CAROLINA

Infrastructure and economic development must take place within a framework. Almost all private businesses, even the smallest, have a business plan for the future. This plan lays out how much they will grow and what they need for growth. On the other hand, few local governments in a state or even the state as a whole have a "business plan" for their future. Most local governments that engage in capital planning do so without regard for regional growth issues and are primarily concerned with development taking place strictly within their boundaries. Without judicious planning, local governments live from day to day and must respond to crises rather than avoiding them. Without infrastructure planning, there are no mechanisms to ensure that scarce resources are being used in the best possible way. Developing local, regional, and statewide infrastructure plans is the cornerstone for the state's policy for future growth.

No business plan can be implemented nor meaningful priorities established without a designated administrative body to make decisions that will benefit all. A Division of Regional Development within the State Budget and Control Board could serve as a central authority and coordinating body responsible for establishing an infrastructure prioritizing process.

The Division of Regional Development would act in an advisory role to assist local and regional planning agencies. It would comprise several current subsidiary agencies approved by the State Budget and Control Board.

EDUCATING THE PUBLIC ON INFRASTRUCTURE NEEDS

At the heart of the challenge of infrastructure finance is a lack of general understanding regarding the relationship between the presence of infrastructure and the level of a community's quality of life, and practically no understanding of the costs of infrastructure and the sources of revenue upon which infrastructure depends. The public view is that infrastructure "is there and lasts forever." Further, "infrastructure is expensive to fund; avoid it so that taxes don't go up." Obviously, a key element of a successful infrastructure program is educating the public (including elected and appointed officials) about the nature of infrastructure and the costs/benefits of maintaining and improving it.

It is the responsibility of the Division of Regional Development to initiate an educational program. The Division of Regional Development must understand who the audience is, what the needs are, and how best to communicate the need message to the identified audience.

CONCLUSIONS—FUTURE ACTIVITIES

It is absolutely essential that the state of South Carolina not miss the opportunity to plan and provide for infrastructure at a time when infrastructure is needed. The state will undergo significant and sustained growth for the foreseeable future; not to provide, or to cut back, on infrastructure during this critical period will cause congestion and overload on each and every aspect of the system. Quality of life will decline, and those now seeking out South Carolina as a location for business development and residence will go elsewhere.

One of the most important lessons of our time is that "quality sells." This dictum means that to the degree something is done well, people will seek it out and buy into it. This should be the byword for South Carolina in the future. The necessary accompaniment to development, i.e., infrastructure, must be done well. Transportation, education, recreation, the arts, and the public justice system should be funded to the degree that they work exceedingly well. If this is done, the state will flourish and mature, and people will continue to be attracted to it. If it is not done, South Carolinians will pay the price of growth competition, and other regional growth participants will emerge as leaders. All of the evidence that has been produced to date confirms that growth is directly related to quality of life. To the degree that growth diminishes because of lack of infrastructure, so will quality of life. Roads that work, an educated labor force, prime recreational facilities, adequate utilities, and cultural amenities attract businesses and taxpaying citizens to an area.

SECTION I

PROJECTION OF STATEWIDE INFRASTRUCTURE COSTS 1995–2015

INTRODUCTION

INTRODUCTION

The purpose of the following section is to present a detailed estimate of current and future infrastructure costs in the state of South Carolina.

The infrastructure cost estimates are a product of The Resource Investment and Management Systems (TRIMS) model developed in the state of New Jersey and population and employment projections produced by the Data Center of the state of South Carolina. Cost estimates include planned infrastructure projects that have not yet been carried out *(backlog)*; improvements to existing and future infrastructure after they have been put in place *(rehabilitation)*; and future infrastructure projects necessitated by both population and employment growth *(new growth)*.

Infrastructure cost estimates encompass capital projects at the local level to maintain existing systems and support future growth (*local infrastructure*) as well as those at the state and regional levels, which serve regional needs even though they may be located in a single area (*regional infrastructure*).

There are seven categories of infrastructure, each composed of three to six subcategories. The categories *(transportation; commerce; public safety/administration/welfare; education; health; recreation/culture; environment)* follow standard public finance grouping procedures for the classification of capital facilities.

Infrastructure cost estimates are presented for each of the state's ten regions. Regional totals sum to the state. The sum of regional and local expenditures equals the sum of backlog, rehabilitation, and new growth expenditures.

The TRIMS model estimates future infrastructure costs by: 1) calculating by category existing per capita and per employee infrastructure costs at the state and regional levels, and 2) applying per-unit costs to projections of population and employment growth. Where possible, information has been obtained from the state of South Carolina's departmental infrastructure projections and existing Council of Governments. These data are augmented by special reports on infrastructure of particular types that have been completed within the state. Where in-state data are not normally broken out into the categories as presented, data from other states has been used to create these categories.

It must be stressed that what follows are projections of infrastructure *need*. These figures may be substantially higher than actual infrastructure *expenditures* because, in practice, backlog infrastructure projects are infrequently built; infrastructure rehabilitation is typically underfunded; and new infrastructure is reluctantly authorized.

The infrastructure projections contained herein:

- use all information available in the state of South Carolina on infrastructure needs and costs;
- are sensitive to national and state experiences with regard to infrastructure provision;
- reflect the cost of providing such infrastructure in the state of South Carolina;
- reflect current (1996) costs inflated to this year from 1990 or more recent data;
- have checks and balances between categories of infrastructure and types of infrastructure needs.

DETERMINING INFRASTRUCTURE NEED

Infrastructure need is calculated using multiple iterative processes to develop increasingly accurate approximations of infrastructure need. The first estimate of a state's infrastructure need is determined using standards on a per capita basis from other states. Prior infrastructure studies that Rutgers University has undertaken in Delaware, Kentucky, Maryland, Michigan, New Jersey, and New York contribute to a blended per capita number to calculate infrastructure need by category. Twenty-eight categories of infrastructure within seven overall infrastructure fields are projected. "Per capita" costs are expressed per new resident and per new employee.

These gross estimates of infrastructure need form the "sacks of cost" which are then filled with the planned infrastructure development expenditures of units of state and local (county and municipal) government. Thus, when numbers exist for gross need across 28 categories of infrastructure, and these sum to a total for the state and are further divided by state and local subcategories, these "sacks" can be filled by planned South Carolina-specific expenditures. All of the capital facilities budgets of state and local governments, independent commissions and authorities, and private producers of public goods (utilities and telecommunications) are scrutinized to determine projected capital facilities spending. Thus, the bounds of the "sacks" established by using information from other states are filled with South Carolina-specific information. This causes some infrastructure areas' expenditures to expand while others contract.

South Carolina information is provided in various formats and for varying time periods. Some data are in the form of five-year projections, whereas other data provide ten- or twenty-year projections. Some information is expressed as historical expenditures that must be projected into the future. Other information reflects just those expenditures being made "out of pocket" today. All this information must be assimilated and converted to twenty-year projections, ensuring that these costs are not underestimated because of historically low expenditure patterns in an area or because information has not been compiled in a way that captures the true outlays for a particular infrastructure category.

Once actual expenditures for each category of infrastructure have been calculated, these expenditures are divided by projections of population and employment in the state and regions to develop South Carolina-specific per capita infrastructure numbers. Thus, specific per capita infrastructure numbers are developed using South Carolina's own infrastructure projections and its own projections of population and employment.

The procedure above ensures comparable national standards of public capital expenditures yet also refines these standards to reflect the specific South Carolina experience. With the South Carolina-sensitive refinements incorporated, numbers are available to project infrastructure need using the best information on both capital facilities spending and growth in the state.

BACKGROUND

BACKGROUND

THE NATURE AND VALUE OF INFRASTRUCTURE

Infrastructure is defined as roads, bridges, mass transportation, airports, ports and waterways, water supply, waste treatment and disposal, energy supply, and communications. Infrastructure in the nation's 83,000 cities and other local jurisdictions is the underpining for the national economy. It is the foundation upon which industrial wealth is created; it is utilized by every citizen and all industries.

Despite its importance, U.S. infrastructure investment as a percentage of gross domestic product (GDP) has been declining for more than twenty years. It decreased from a 1975 high of 2.4 percent of GDP to a 1995 low of 0.3 percent. In contrast, Japan and Germany spend an average of 5.1 percent and 2.5 percent, respectively, of their GDPs on domestic infrastructure. Accordingly, they have productivity growth rates that are much greater than that of the United States.

In 1991, the Congressional Office of Technology Assessment (OTA) warned that if more investment in certain crucial infrastructure areas is not ensured soon, the negative impacts on transportation efficiency, industrial productivity, and national competitiveness will cost the country dearly. If the United States is to improve its competitiveness and sustain its economic growth, there must be continued investment in, and development of, basic local infrastructure.

Infrastructure investments also have multiplier effects especially if some investments are dedicated to high-return activities of small firms. The OTA recognized this with the admonition that immediate attention must be paid to developing programs to determine the most promising new investment areas for public works. Most of those who follow this discourse recognize that basic development infrastructure investment at the local level is key to spurring small firm growth.

Infrastructure represents an annual expenditure in the United States of approximately $140 billion, with 24 percent of this amount ($33.6 billion) coming from the federal government. Since this national investment in infrastructure is dispersed among numerous federal, state, regional, and municipal agencies, comparatively little research has been done to document the need, distribution, and impacts of such investment.

ECONOMIC DEVELOPMENT AND GROWTH

The Ideal Case

Economic development refers to the growth of residential and nonresidential structures on primarily private lands. This growth is driven, in turn, by population and job growth in geographic areas and is responded to by providers of public infrastructure there.

There is a lead-lag relationship between population and job growth in which a critical mass of population is needed before a significant amount of jobs can come on-stream; yet, with the arrival of jobs, so too comes a new increment in population. In an ideal setting, growth is a relatively orderly process, and public and private institutions facilitate growth. Infrastructure is in place where needed, and this infrastructure is neither overused nor undermaintained. Further, there are reasonable relationships between the existing economy and new growth, both in type and location. One type or location of economic growth does not dominate another. Similarly, reasonable relationships exist between

residential and nonresidential development with the result that the journey to work is relatively short and efficient, and there is an equitable balance of income groups paralleling job opportunities within and across regions. In other words, growth is efficient, and the economic development of the state is maximized. All of the growth components are harmonious, and minimal conflict leads to maximum statewide fiscal health and economic prosperity.

The Real Case

Unfortunately, actual economic growth departs from ideal conditions in that (1) the competition for market share creates "haves" and "have-nots," and (2) the public-sector regulatory overlay, in attempting to better distribute statewide economic development, often sends confusing signals and misses sizable opportunities. As an example, new large-scale commercial and industrial developments are free to locate within the "prime" regions of South Carolina, causing even more infrastructure to be extended to them and placing these political entities in competition with each other.

Simultaneously, other regions within the state have managed to attract very little "blue chip" economic activity and have become home, by default, to a limited number of noxious industries and a vast majority of poorly paid residents. Economic opportunities and large areas of the state have been overlooked.

The dual costs of (1) providing new and extended infrastructure to regions that compete for and win new development, while (2) maintaining the old infrastructure in regions that are left behind, cause taxes and development costs to rise throughout the state. As a result, wage and product costs increase statewide, and businesses and the state as a whole become less competitive. The reality of this inefficient expansion and competition is economic triage, wherein a finite amount of money is distributed politically among competing entities, causing all regions and regions to go wanting economically. These are the middle-stage signs of a state that is in the process of making the wrong decisions en route to policies that will, in the end, lead to a major loss of economic tenants.

The reason these patterns continue is that, in the short run, they are not all that bad for any individual location. Firms and people are "distributed" to regions that minimize the out-of-pocket costs to the economic entities. Yet the long-run, larger state costs are not considered. The reality is that all of the projected extensions of capital facilities cannot be paid for, and very significant opportunities will be missed because of misplaced or inadequate resources.

An Alternative Case

An alternative is not to stop growth but to channel it efficiently, encouraging growth in locations where it makes the most sense for overall development of the state while at the same time ensuring that no individual region is neglected. High-growth regions must continue to grow and be provided with infrastructure, but growth in other lower-growth regions must also be encouraged. This is not "setting growth loose" within the state as some may charge. In both types of locations—those areas that have traditionally been growing and those now encouraged to grow—environmentally sensitive and other lands will be conserved to maintain the state's natural scenic qualities. Much of the growth that

would have taken place in traditional growth regions will continue to be encouraged, only in more compact and efficient development patterns near already existing development. Growth in regions where there has not been much development before is now encouraged in newly formed centers attached to existing crossroads locations. Additional development in high-growth regions is handled more carefully and elegantly; development in low-growth regions is accelerated and strategically located. There is no situation of "haves" and "have-nots" and no infrastructure bankruptcy or excessive dilution. Growth is carefully channeled to maximize its impact. Billions of dollars of infrastructure monies can be redirected and not wasted on competing or non-strategically located entities.

The process above is termed "strategic economic development," and this form of development can be practiced in South Carolina. Increasingly, positive linkages have been found between economic development and quality of life. A Princeton University study found that the most significant variable associated with enhanced quality of life is an increase in the local property tax base per capita. In other words, those locations with more industrial, commercial, and residential value per capita have the highest quality of life. Crime rates are lower; educational test scores are higher; real estate resale prices are higher; recreational amenities are higher; and residency times are longer in those communities with the highest tax bases.

THE RELATIONSHIP BETWEEN STRATEGIC ECONOMIC DEVELOPMENT AND INFRASTRUCTURE DEVELOPMENT

Strategic economic development seeks to improve both the quality of life and the standard of living of a state's residents. It does this by targeting areas of critical capital spending to expand existing growth nodes and to encourage new enterprises in areas where they currently do not exist. Business location decisions are heavily influenced by factors in a state that encourage business growth. In addition to a skilled labor force, these factors include adequate public facilities and a high quality of life. The absence of water and sewer curtails the construction of businesses and housing. Increasing costs of solid waste disposal drive up industrial and commercial expenses and reduce personal disposable income. Clogged transportation arteries frustrate commuters and disrupt the delivery of goods and services. The careless use of open space and the inadequacy of recreational services make a state less attractive to businesses, residents, and tourists.

In a free enterprise economy a state's economic health depends upon growth. Growth produces jobs, housing, and commerce. Growth is needed to generate tax revenues to maintain roads, transit systems, water and wastewater systems, and other infrastructure. The best approach is to neither limit growth nor passively accept its consequences: it lies in managing public investment in infrastructure and natural resources wisely and in viewing economic development strategically. The reality is that without growth the bills can't be paid; conversely, with too much growth, infrastructure can't be provided quickly enough to consume the revenues on hand.

One way to deal with growth is to ensure that there is ample infrastructure both in place and projected for the future. In the past, this has been done primarily through public financing activities of local governments supported by existing residents.

With spiraling costs and the reduction of federal subsidies, states must be resourceful in paying for capital facilities. First, the state must now be more certain that poorly timed or inappropriately located capital facilities are minimized. Second, the state must look for an infrastructure development partner. That partner is the private sector—a sector with whom the state must maintain good relations. The private sector, as a user and provider of infrastructure, plays a key role in financing infrastructure by paying for or constructing facilities occasioned by new development, funding infrastructure developed through user-generated revenues, and/or by participating in joint infrastructure ventures with the public sector.

It must be realized that economic development and infrastructure are linked. A good environment for business translates into a high quality of life for residents.

Economic development brings benefits and costs to many. In most instances, benefits far exceed costs, but costs cannot be ignored. Excessive costs and inefficiencies must be eliminated and costs, in the form of infrastructure development, must be shared by growing and non-growing regions as well as private- and public-sector developments.

In the current climate of federal retrenchment, states cannot "give away the store" to new growth. Further, one cannot neglect existing businesses, many of which are in place and competing on a day-to-day basis without incentives, nor can one ignore current residents who are not able to pay another dime in property taxes. These mature and prime citizens of the state must be retained at all cost. Retention of the state's existing firms and long-time residents can be achieved through strategic economic development that prioritizes allocations of resources based on a carefully derived view of the future.

DEFINITIONS RELATED TO INFRASTRUCTURE

DEFINITIONS RELATED TO INFRASTRUCTURE

Basic Definitions – General

Infrastructure consists of capital investments in land and public facilities that are necessary to support development and redevelopment for the health, safety, and welfare of citizens. These investments include public or private capital to support public or private development for the general welfare of the public.

Local and community infrastructure provides site-specific public facilities and is sensitive to the degree of development and redevelopment. The facilities provided include public water supply, wastewater treatment, public transportation, and highways and streets.

Regional infrastructure provides services to support areawide development and redevelopment. Provision of regional infrastructure is less sensitive to specific locations and patterns of growth. The facilities provided include major intrastate highways, public transit, airports, energy facilities, regional solid waste management, and other systems.

Infrastructure Need

Infrastructure need is determined by the extent to which desired *levels of service* and *standards of quality* are achieved and maintained given estimates and projections of future demand and current maintenance.

Levels of service for local and community capital facilities are typically defined in terms of the relationship of demand to designed capacity. *Standards of quality* for regional infrastructure are typically defined in terms of societal objectives such as waters that are safe for fishing and swimming; the number of direct flights to, or passenger miles served by, airports within the state; or hauling times to, or cubic dimensions of, solid waste disposal sites.

Types of Need

Local and community needs reflect those capital needs that are sensitive to municipal and regional growth. *Regional needs* reflect the demands of regional and statewide growth, respectively. *Backlog needs* are the capital needs required to correct deficiencies in systems that serve the existing population. *Rehabilitation needs* are the recurring periodic capital needs to make major improvements in the existing systems. *New growth needs* are the anticipated capital needs to augment the existing systems to new growth.

Infrastructure Costs and Revenues

Infrastructure *costs* are the current dollar requirements to provide infrastructure, including backlog, rehabilitation, and new growth. Cost, determined using techniques appropriate for each infrastructure system, relates needs to estimates of costs for units and/or similar systems. Infrastructure *revenues* are the sources of finance used to pay for infrastructure costs. Traditionally, revenue sources are based on projections of authorized or appropriated revenues applicable to each infrastructure system.

DETAILED DEFINITIONS

Backlog Need – an infrastructure need that corrects existing deficiencies related to infrastructure capacity or condition. Examples include improvements to bridges that do not meet federal structural safety standards and must be repaired (condition), and a commuter rail line that does not have sufficient rolling stock to adequately serve the number of commuters on its lines (capacity). In an infrastructure need projection there are no future backlog expenditures.

Capital Outlays – the direct expenditure(s) for contract or construction of buildings, roads, and other improvements; for purchase of equipment, land, and existing structures; and for payments on capital leases. This term includes expenditures for additions, replacements, and major alterations to fixed works and structures. However, repairs are classified as current operation expenditures, as are payments on operating leases.

Infrastructure and Infrastructure Systems – capital facilities and land assets under public ownership, operated or maintained for public benefit, that are necessary to support development and redevelopment and protect the public health, safety, and welfare. Infrastructure systems include transportation, energy, telecommunications, farmland retention, water supply, wastewater disposal, storm water management, shore protection, open space and recreation, solid waste management, public health care, public education, higher education, arts, historic resources, public safety, justice, public administration, and public housing.

In these respects, *infrastructure* is the overhead needed to maintain society and the economy. Investments in infrastructure are investments in the future of the economy, environment, government, and culture. The following criteria further define *infrastructure:*

- facilities and assets that are publicly owned and/or serve the public health, safety, and welfare;
- facilities and assets that may influence the form or the location of development and redevelopment;
- capital facilities with a high fixed cost (> $50,000) and a long service life (> 10 years).

Infrastructure Need –determined by the extent to which existing or desired levels of service and standards of quality for infrastructure systems are achieved and maintained given estimates and projections of demand.

Municipal and Regional (Local) Infrastructure – components and systems that provide site-specific public services commonly associated with growth. These include, but are not limited to, public water supply, wastewater treatment, public transportation, and streets.

New Growth Need – the anticipated need for new infrastructure capacity to serve projected increases in population and employment resulting from new development and redevelopment from the projection date to the horizon year, in this case 1995 to 2015.

Rehabilitation Need – an infrastructure need associated with recurring, periodic improvements and/or replacements of capital facilities necessary to keep existing and anticipated infrastructure in service, at least through the horizon year of the assessment. *Rehabilitation needs* are distinct from, and do not include, routine operations and maintenance costs. For example, rehabilitation needs would include a roadway resurfacing project that may take place every ten years but would not

include routine street cleaning and patching.

Scale of Service Delivery – Projected costs for infrastructure may be differentiated based on the *scale of service delivery* provided by the infrastructure. This assessment has two classifications, *regional* and *local*.

Regional – Infrastructure that may be categorized as *multiple region or statewide infrastructure*, and certain land assets that possess characteristics of regional or statewide infrastructure, are generally considered to be of a *regional* scale.

Local – Municipal and regional infrastructure and land assets sensitive to *local* patterns of growth and development are generally classified as *local* in scale.

Statewide (Regional) Infrastructure– services to support development and redevelopment throughout the state or its subregions that are not especially sensitive to local sites and patterns of growth and development. These include freeways, airports, energy facilities, solid waste management, higher education facilities, and other systems not elsewhere classified.

Trends or Current Conditions – the probable development patterns and associated demands for infrastructure arising from current trends projected into the future, patterns and projected magnitudes of population and employment growth, based, in turn, on current private and public practices regarding land development.

EXAMPLES OF INFRASTRUCTURE NEED

FIGURE 1.
EXAMPLES OF INFRASTRUCTURE NEED

Transportation

	Regional	Local	Backlog	Rehab	New Growth
Roads	Interstate and state highways	Local roads	Deferred highway construction	Ten-year road resurfacing	State road construction
Bridges/ Tunnels	Major bridges linking regions or states	Bridges across streams, railroads, or roads	Deferred bridge construction	Replacement of bridge superstructure or undercarriage	New or expanded bridge capacity
Public Transport	Commuter rail stations or bus parking lots	Bus stations	Deferred rail station construction	Bus terminal rehabilitation	Passenger rail car or bus purchase
Freight	Rail line addition	Rail sidings for regional industrial parks	Deferred port freight handling facilities	Major service road upgrades	New rest stops for road freight
Ports	Digging, dredging, providing docks, or commercial buildings	Docks or buildings for recreational boating	Deferred projects for links to road or rail access from water-based facilities	Regular dredging or building alteration	New docks, buildings, cranes, etc.
Aviation	Metropolitan airports	County airports	Deferred metropolitan airport	Air traffic control or other equipment upgrade	New metropolitan airport construction
Other Transport	Statewide bicycle path program	Local walking and jogging paths	Deferred bicycle path improvement	Resurfacing jogging paths	New right-of-way purchase

Commerce

	Regional	Local	Backlog	Rehab	New Growth
Economic Development	Science park or regional public works project	Industrial park	Deferred computer laboratory construction	Agricultural research laboratory upgrade	New industrial park
Farmland Retention	State purchase of significant regional farm	Farmland purchases in county	Deferred farmland purchase	Purchase of adjacent farmland	Farmland purchase
Energy	Pipeline	Utility lines	Deferred pipeline construction	Electrical generating station conversion	Electrical generating station construction
Telecom-munications	Telephone communica-tions network	Cable television	Deferred telephone switching station construction	Fiber optic installation	Cable television installation

FIGURE 1.
EXAMPLES OF INFRASTRUCTURE NEED (Continued)

Public Safety, Administration and Welfare

	Regional	Local	Backlog	Rehab	New Growth
Public Safety	State or regional prison	County jail	Deferred state prison construction	Prison electrical improvements	Increased prison bed capacity
Justice	State justice complex	County courthouse	Deferred courthouse construction	Upgrading of courthouse security systems	New or expanded courthouse construction
Public Housing	Public housing complexes	County homeless shelters	Deferred construction of halfway houses	Structural repair to shelters	Construction to meet demand for scattered-site housing

Education

	Regional	Local	Backlog	Rehab	New Growth
Public Education	High schools and junior high schools	Elementary schools	Deferred construction of school buildings	Major roof or structural repair of schools	Expansion of classroom space
Higher Education	State universities and technical colleges	County colleges	Deferred construction of academic buildings	Major roof or structural repair of university buildings	Additional dormitory or recreational facilities

Health

	Regional	Local	Backlog	Rehab	New Growth
Public Health Care	Major research hospital or trauma center	County hospital or clinic	Deferred construction of children's hospital	Public space upgrades in state psychiatric care facilities	New construction of state forensic center
Water Supply	Regional reservoir	County pumping station	Deferred linkage of water supply systems	Repair of reservoir	Construction of new local pumping stations
Waste Water Disposal	Major sewage treatment facility	Home and neighborhood sewer lines	Deferred construction of sewage treatment facility	Upgrade to sewage treatment facility	Addition to sewage treatment capacity
Solid Waste	Regional landfill	County recycling center	Deferred purchase of regional solid waste facility	Environmental upgrade to existing landfill	Construction of additional recycling facilities

FIGURE 1.
EXAMPLES OF INFRASTRUCTURE NEED (Continued)

Recreation and Culture

	Regional	Local	Backlog	Rehab	New Growth
Recreation Facilities	Major state nature preserve	County park system	Deferred purchase of additional park-land	Upgrading of public marinas	Acquisition and construction of additional parks
Arts/ Libraries	State art center	County library	Deferred construction of state record storage center	Remodeling state library	Construction of regional special purpose library
Historic Resources	State museum	Locally significant historic buildings	Deferred construction of geological museum	Painting and upgrading visitors' center at state historic site	Refurbishing state and local buildings in rural locations

Environment

	Regional	Local	Backlog	Rehab	New Growth
Storm Water Management	Flood basin control	Drainage culverts	Deferred flood control project	Major dam repair	New regional water containment facilities
Shore Protection	State beach replenishment	Groins and jetties	Deferred breakwater construction	Groin and jetty repair	New breakwater construction
Sensitive Land and Water	Major wetland recovery operation	Wetland mitigation efforts	Deferred wetland recovery	Hazardous waste cleanup	Purchase of watershed development rights
Open Space and Recreation	State park system purchase	County park system purchase	Deferred purchase of parkland	Park improvements at various sites	New purchases of parkland statewide
Air Pollution	Electrical generating station scrubbers	Nonresidential monitoring devices	Deferred purchase of major improvements to technology	Refurbishment of air pollution monitoring equipment	Purchase of new technology to limit generating station pollution

STATE, REGIONAL, AND COUNTY GROWTH

STATE, REGIONAL, AND COUNTY GROWTH

State Growth

South Carolina is a state whose 1995 3.7 million population and 1.6 million jobs have increased by one-third and one-half, respectively, since 1970. In twenty years, by the year 2015, South Carolina will increase its population by about 23%, or almost 850,000, and will increase its job base by 30%, or 480,000. (See Figure 2.) It is a state that attracted $5.4 billion in nonresidential development investment in 1995, exceeding the previous yearly record by 45 percent. The jobs emerging from this growth—the largest number of jobs created in three decades (nearly 24,000)—paid an average wage of $28,500, $6,000 higher than the state average, and $2,000 higher than the national average.

Regional Growth—The "Known Five"

The vast majority of the new growth is occurring in five of the state's ten regions. (See Figures 2 and 3 [map].) The Appalachian (Greenville-Spartanburg) Region in the northwestern portion of the state is the home of BMW's domestic production facilities. In 1995 this region had the largest share of population (26%) and employment (29%) in the state. It is within the I-85 corridor from Atlanta to Washington, D.C., and is home to most of the "blue-chip" plants and manufacturing facilities that come to South Carolina. This area has the greatest diversity of employment across SIC sectors, the highest median income, and the highest number of automobile registrations. By 2015 its population will increase by 23 percent and its employment by 24 percent.

The Central Midlands Region is the home of the state's capital (Columbia) and is the center of the state's white-collar growth in the form of private-sector professionals, government workers, and university faculty, students, and staff. This region, which is cross-cut by Interstates 20 and 26, has 15 percent of the state's population and 18 percent of its job base. Population is expected to grow in this region by 24 percent and employment by 30 percent by the year 2015.

Charleston, on the eastern coast toward the middle of the state, is the home of port-oriented activities, the military, and cultural tourism. It is part of the Berkeley-Charleston-Dorchester Region, which is accessed from the north and south via Interstates 95 and 26. It has a slightly smaller population (7%) than the Central Midlands Region and about 26 percent less employment. It will grow by 22 percent in population and 50 percent in employment over the 20-year period 1995–2015.

The Myrtle Beach area, or the Grand Strand, is part of the Waccamaw Region, located along U.S. Highway 17 in the northeastern part of the state. This region, known for beach-oriented tourism and golf, is one of the fastest-growing regions in the state. Twenty years of growth will increase population by 41 percent and employment by 32 percent.

Hilton Head is part of the Lowcountry Region and is accessed via Interstate 95 in the extreme southern part of the state. This area, once known primarily for retirement or second-home development on Hilton Head Island, is now experiencing significant off-island

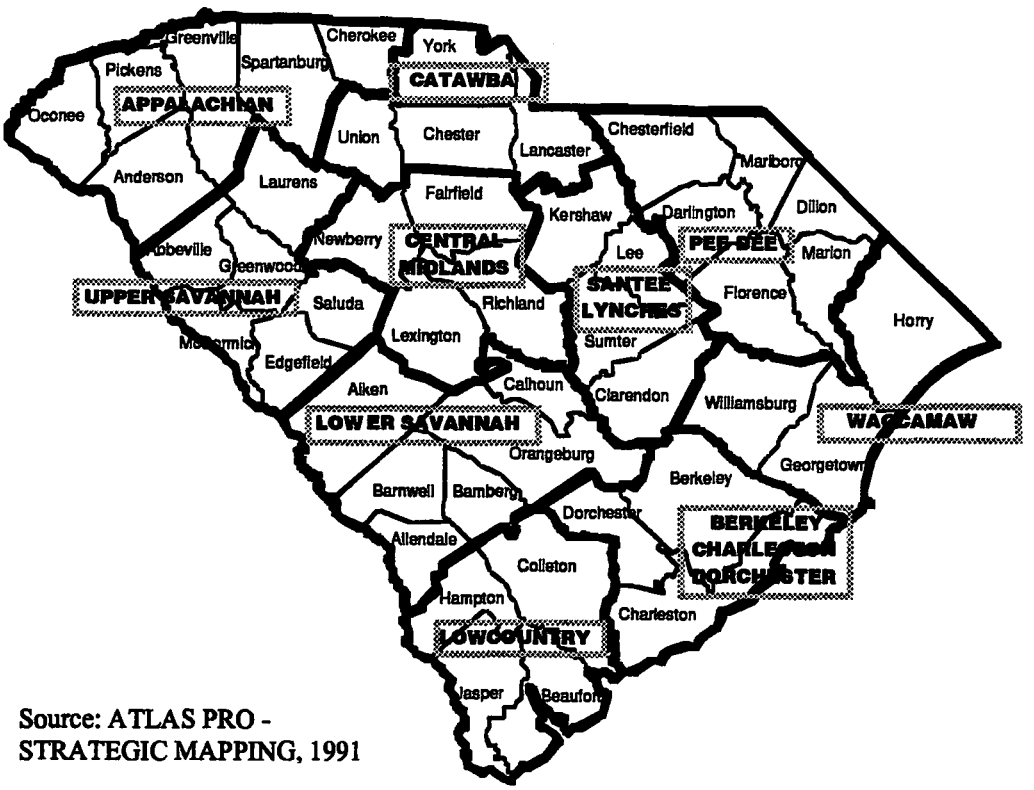
FIGURE 2.
POPULATION AND EMPLOYMENT GROWTH IN SOUTH CAROLINA

1995-2015

REGION	1995 Population	2015 Population	Population Change #	Population Change %	1995 Employ-ment	2015 Employ-ment	Employment Change #	Employ-ment Change %
S.C. State total	3,673,287	4,673,755	1,000,468	27%	1,612,187	2,141,216	529,030	33%
Upper Savannah	192,484	214,624	22,140	12%	70,280	85,403	15,124	22%
Pee Dee	322,056	345,197	23,141	7%	127,719	161,088	33,369	26%
Catawba	264,036	315,736	51,700	20%	96,607	131,176	34,569	36%
Waccamaw	246,259	415,100	168,841	69%	105,080	158,278	53,198	51%
Lowcountry	172,103	274,100	101,997	59%	58,236	78,629	20,393	35%
Lower Savannah	283,903	332,998	49,095	17%	130,179	202,921	72,742	56%
Central Midlands	538,437	656,200	117,763	22%	274,278	359,306	85,028	31%
Santee Lynches	201,678	246,600	44,922	22%	65,340	82,337	16,997	26%
Appalachian	945,911	1,062,000	116,089	12%	445,746	556,788	111,042	25%
Berkeley-Charleston-Dorchester	506,420	811,200	304,780	60%	238,720	325,290	86,570	36%

FIGURE 3.

COUNTIES (46) AND COG REGIONS IN THE STATE OF SOUTH CAROLINA



Source: ATLAS PRO - STRATEGIC MAPPING, 1991

population and employment growth. It is the smallest region in both aggregate population and employment, but it is the second fastest-growing region in population growth and is tied for first in employment growth.

Regional Growth – The "Comers"

The above five regions represent 66 and 71 percent of the state's population and employment, respectively; they represent about 74 and 76 percent of projected growth in these two sectors. This means that significant new growth will be taking place in other regions of the state, which is reason enough to begin to consider how infrastructure monies will be raised and allocated throughout the state. Historical patterns of South Carolina growth are still very evident, but there are also emerging activities in regions whose needs require attention.

Of the earlier-mentioned "Known Five" regions, the Lowcountry Region has the smallest projected population growth, estimated at about 59,000 over the twenty-year period.

Of the remaining regions, the Upper Savannah Region, while embraced by Interstates 20, 26, 385 and State Road 72, lacks an interstate in and around Greenwood. The Upper Savannah Region has more employment than the Lowcountry Region, but its employment will grow by a much smaller amount. (The growth in employment change will be only about a third of the growth in the Lowcountry Region.) The Upper Savannah Region, surrounding the Sumter National Forest, is and will continue to be a significant tourist destination and has been discovered by such national and international firms as Sara Lee and Fuji.

The Catawba Region in the north-central part of the state is bisected in a north-south direction by Interstate 77 running from Columbia, SC to Charlotte, NC. Its population will grow by about 83,000 or 31 percent over the period 1995-2015. Employment growth of about 26,000 for this region will be nearly two and a half times the rate of the Upper Savannah Region. The Catawba Region is largely influenced by the growth of Charlotte, NC. Charlotte has excellent airport facilities and is only 90 miles north of Columbia.

The Lower Savannah Region, surrounded by Interstates 20 and 26 in the north and the US Route 301/I-95 corridor in the south, will grow by 60,000 in population (21%) and 26,000 in jobs (24%). A new solid waste facility has been developed at the U.S. Department of Energy, Savannah River Plant. This will answer the region's solid waste needs.

The Santee Lynches Region, the region immediately east of the region containing the state's capital, will grow by 31,000 in population or about 15 percent, and by 22,000 in employment, or about one-third. The region is traversed by Interstate 20 in an east-west direction in its northern half and by I-95 in a north-south direction in its lower half. The changing military priorities of the U.S. government continue to heavily influence the economy of this region.

The Pee Dee Region, northwest of Myrtle Beach and bordering North Carolina, will be the slowest growth region in the state in population but will still grow by about 23,000 in population and 29,000 employment. The region is divided by Interstate 95 in a north-south direction but lacks an equivalent east-west thoroughfare. State Road 501 is underdeveloped in this region.

OVERVIEW OF INFRASTRUCTURE NEEDS

OVERVIEW OF INFRASTRUCTURE NEEDS

INTRODUCTION

Table I–1 shows infrastructure needs for the state of South Carolina and Tables I–2 through I–11 for its ten Council of Governments (COG) regions. Infrastructure need is presented by seven major categories and includes 28 different areas of growth-related capital outlays. The major categories of expenditure are:

- Transportation
- Commerce
- Public Safety, Administration and Welfare
- Education
- Health
- Recreation and Culture
- Environment

Infrastructure is divided into *regional* need (state- or COG-required) and *local* need (region- or municipality-required). It is also divided into *backlog* (deferred from completion), *rehabilitation* (system repair and improvement), and *new growth* needs (additional capital facilities required).

STATE INFRASTRUCTURE NEEDS

State infrastructure needs for South Carolina will amount to about $57 billion over the twenty-year period 1995 to 2015. More than 58 percent of this infrastructure need is related to new growth ($33 billion); about 25 percent is related to rehabilitation needs, and approximately 17 percent is related to backlog. (See Table I–1.) It is assumed that backlog will be met during the twenty-year period and that it will not reoccur over the period. It is further assumed that system upgrading (rehabilitation) will take place continuously, including that required for new growth infrastructure as it ages over time.

By far the most significant category of statewide infrastructure need relates to transportation. This category alone amounts to 51 percent of the state's projected infrastructure need. Expenditures on roads, in turn, constitute three-quarters of this amount.

Other significant statewide categories of infrastructure requirements are: education (18% of total); health (14%); commerce (7%); public safety, administration and welfare (5%); the environment (3%); and recreation and culture (3%).

In terms of *both* existing development and new growth, the most significant capital expenditures will be for roads, bridges, public education and higher education, water, sewer, and economic development. On a per capita basis (including all residents and employees), new growth infrastructure need amounts to about $5,000 per new state resident over the next twenty years, and backlog/rehabilitation costs (system maintenance) amount to $3,600 per existing resident. (See Figure 4.) These are daunting levels by any estimate.

INFRASTRUCTURE NEED BY REGION

Projected infrastructure needs within the state's ten regions ranges from a high of $12 billion to a low of $2 billion. (See individual region tabulations, pp. 53–62.) The region with the highest projected need is the Appalachian; the region with the lowest is Santee Lynches. The highest-spending regions contain the growth nodes of Greenville-Spartanburg and Charleston; the lowest-spending region is comprised of slower-growth regions in a region west of the state's capital. Two regions that fall toward the upper end of the infrastructure need distribution are the Central Midlands Region, at $8 billion, and the Waccamaw Region, at $5 billion. These regions contain the cities of Columbia and Myrtle Beach, respectively. Columbia is receiving considerable public building investment,

whereas Myrtle Beach is experiencing a significant amount of tourism-related infrastructure outlays.

The remaining five regions (Upper Savannah, Pee Dee, Catawba, Low-country, and Lower Savannah) have projected infrastructure needs in the $2–$4 billion range. With the exception of Pee Dee and Upper Savannah, these are all regions that will grow by between 55,000 and 85,000 in population over the upcoming twenty-year period. Pee Dee, larger than most of these other regions, will grow by only about 23,000 over the period and Upper Savannah by 24,000.

FIGURE 4.
EXISTING AND NEW GROWTH INFRASTRUCTURE COSTS IN SOUTH CAROLINA

1995–2015

REGION	Total Backlog and Rehab Costs (in $ millions)	Backlog and Rehab Costs per Capita ($)	Total New Growth Costs (in $ millions)	New Growth Costs per Capita ($)
S.C. State Total	23,709	2,959	30,269	15,569
Upper Savannah	1,207	3,324	1,193	24,329
Pee Dee	1,856	2,966	1,472	17,981
Catawba	1,530	3,113	1,827	15,979
Waccamaw	1,712	3,322	3,241	12,274
Lowcountry	1,540	6,672	2,311	16,556
Lower Savannah	1,844	2,792	2,082	11,702
Central Midlands	3,485	2,821	4,526	16,688
Santee Lynches	1,020	2,700	1,120	14,892
Appalachian	5,504	2,737	5,367	17,264
Berkeley-Charleston-Dorchester	4,009	3,280	7,131	15,559

GROSS INFRASTRUCTURE NEED

STATEWIDE INFRASTRUCTURE COSTS

Table I-1
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
STATE TOTAL

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	13,426	8,320	3,098	5,488	13,160	21,746
Bridges	2,933	116	185	287	2,577	3,048
Public Transportation	857	330	216	428	543	1,187
Freight (Rail and Road)	245	71	68	146	102	316
Ports/Maritime Activities	1,471	215	338	674	674	1,686
Aviation (Including Air Freight)	427	380	164	239	404	808
Other Transportation Facilities	16	5	4	4	13	20
Total	**19,375**	**9,437**	**4,073**	**7,265**	**17,473**	**28,811**
COMMERCE						
Economic Development	1,699	370	229	85	1,754	2,069
Farmland Retention	52	21	53	9	10	72
Energy	309	85	23	221	150	394
Telecommunications	1,286	31	52	456	809	1,317
Total	**3,346**	**506**	**357**	**772**	**2,723**	**3,852**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	547	1,020	272	245	1,051	1,567
Justice (Courts)	146	339	94	157	234	485
Public Admin./ Instit./ Hsg.	180	401	145	137	298	581
Total	**873**	**1,760**	**511**	**539**	**1,584**	**2,634**
EDUCATION						
Public Education	697	6,346	1,893	1,943	3,207	7,043
Higher Education	2,629	546	152	487	2,536	3,175
Total	**3,326**	**6,892**	**2,045**	**2,430**	**5,743**	**10,218**
HEALTH						
Public Health Care	814	580	382	391	621	1,394
Water Supply	85	2,265	341	585	1,424	2,350
Waste Water Disposal	816	2,176	530	781	1,681	2,992
Solid Waste Management	259	788	540	352	155	1,047
Total	**1,973**	**5,810**	**1,794**	**2,109**	**3,880**	**7,783**
RECREATION AND CULTURE						
Recreational Facilities	155	456	104	172	335	611
Arts / Library	225	252	159	85	233	477
Historic Resources	243	186	98	152	178	427
Total	**623**	**893**	**361**	**408**	**746**	**1,516**
ENVIRONMENT						
Storm Water Management	230	666	141	254	501	896
Shore and River Protection	242	183	64	204	158	426
Sensitive Land and Water	123	140	49	23	191	263
Open Space	66	167	115	56	61	233
Air Pollution	32	15	8	27	12	48
Total	**693**	**1,172**	**378**	**564**	**923**	**1,865**
OVERALL TOTAL	**30,208**	**26,470**	**9,518**	**14,088**	**33,072**	**56,678**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

REGIONAL INFRASTRUCTURE COSTS

UPPER SAVANNAH REGION
PEE DEE REGION
CATAWBA REGION
WACCAMAW REGION
LOWCOUNTRY REGION
LOWER SAVANNAH REGION
CENTRAL MIDLANDS REGION
SANTEE LYNCHES REGION
APPALACHIAN REGION
BERKELEY-CHARLESTON-DORCHESTER REGION

Table I-2
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
UPPER SAVANNAH REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	908	333	121	454	666	1,241
Bridges	131	15	17	15	114	146
Public Transportation	50	7	10	17	30	57
Freight (Rail and Road)	9	2	3	6	2	11
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	-	14	3	3	8	14
Other Transportation Facilities	-	-	-	-	-	-
Total	**1,097**	**372**	**153**	**495**	**821**	**1,469**
COMMERCE						
Economic Development	153	33	16	4	166	186
Farmland Retention	3	1	3	1	-	4
Energy	24	5	2	16	11	29
Telecommunications	37	5	3	13	27	42
Total	**216**	**45**	**23**	**34**	**204**	**261**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	38	78	25	9	83	116
Justice (Courts)	9	21	5	10	14	29
Public Admin./ Instit./ Hsg.	8	26	8	8	18	34
Total	**55**	**124**	**38**	**27**	**114**	**179**
EDUCATION						
Public Education	20	204	65	65	94	224
Higher Education	40	-	2	6	32	40
Total	**60**	**204**	**67**	**71**	**126**	**264**
HEALTH						
Public Health Care	25	19	14	14	16	44
Water Supply	4	82	18	30	39	86
Waste Water Disposal	56	85	28	43	71	141
Solid Waste Management	13	43	31	20	5	56
Total	**98**	**229**	**90**	**106**	**131**	**328**
RECREATION AND CULTURE						
Recreational Facilities	8	21	4	8	18	30
Arts / Library	6	8	6	4	5	14
Historic Resources	12	16	4	9	13	27
Total	**26**	**45**	**14**	**21**	**36**	**71**
ENVIRONMENT						
Storm Water Management	11	26	7	14	17	37
Shore and River Protection	5	17	2	12	8	22
Sensitive Land and Water	6	11	2	1	13	17
Open Space	4	10	6	3	6	14
Air Pollution	1	1	-	2	-	2
Total	**28**	**65**	**18**	**31**	**44**	**93**
OVERALL TOTAL	**1,580**	**1,084**	**403**	**785**	**1,476**	**2,664**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-3
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
PEE DEE REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	1,063	410	201	507	765	1,473
Bridges	225	3	11	30	188	228
Public Transportation	46	6	13	24	15	52
Freight (Rail and Road)	15	4	5	11	4	20
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	15	18	7	8	18	33
Other Transportation Facilities	-	-	-	-	-	-
Total	**1,365**	**442**	**236**	**580**	**991**	**1,807**
COMMERCE						
Economic Development	180	39	29	6	184	219
Farmland Retention	4	2	5	1	-	5
Energy	20	5	1	17	6	24
Telecommunications	95	1	7	57	32	96
Total	**298**	**47**	**43**	**80**	**222**	**345**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	71	78	41	23	84	149
Justice (Courts)	11	26	9	17	10	37
Public Admin./ Instit./ Hsg.	16	36	20	12	20	51
Total	**98**	**139**	**70**	**52**	**114**	**236**
EDUCATION						
Public Education	40	260	100	100	100	300
Higher Education	98	7	5	15	85	105
Total	**138**	**267**	**105**	**115**	**185**	**405**
HEALTH						
Public Health Care	34	25	23	14	21	59
Water Supply	6	115	27	37	58	121
Waste Water Disposal	82	155	58	94	85	237
Solid Waste Management	31	160	108	74	9	191
Total	**152**	**455**	**216**	**219**	**173**	**608**
RECREATION AND CULTURE						
Recreational Facilities	10	31	8	15	18	41
Arts / Library	10	12	10	5	6	22
Historic Resources	10	13	7	10	6	23
Total	**29**	**56**	**25**	**31**	**30**	**85**
ENVIRONMENT						
Storm Water Management	14	30	10	13	21	44
Shore and River Protection	-	7	-	1	6	7
Sensitive Land and Water	3	5	3	2	3	8
Open Space	4	11	9	4	3	16
Air Pollution	2	1	-	2	-	3
Total	**23**	**55**	**22**	**22**	**34**	**78**
OVERALL TOTAL	**2,104**	**1,461**	**717**	**1,100**	**1,748**	**3,565**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-4
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
CATAWBA REGION

Service Area	Regional	Local	Backlog	Rehab	New Growth	Total
TRANSPORTATION						
Roads	911	608	169	526	824	1,519
Bridges	155	5	23	20	117	159
Public Transportation	53	30	16	30	37	83
Freight (Rail and Road)	11	4	4	7	4	15
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	2	11	3	5	5	13
Other Transportation Facilities	1	-	-	-	1	1
Total	**1,133**	**656**	**215**	**587**	**988**	**1,790**
COMMERCE						
Economic Development	137	30	15	6	146	167
Farmland Retention	4	1	4	1	1	5
Energy	19	4	2	13	9	23
Telecommunications	43	-	2	15	26	43
Total	**202**	**36**	**23**	**34**	**181**	**238**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	61	117	31	12	136	178
Justice (Courts)	11	22	8	4	21	33
Public Admin./ Instit./ Hsg.	14	29	10	5	29	43
Total	**86**	**168**	**48**	**21**	**186**	**255**
EDUCATION						
Public Education	22	383	55	55	295	405
Higher Education	313	47	18	54	288	360
Total	**335**	**430**	**73**	**109**	**583**	**765**
HEALTH						
Public Health Care	47	35	19	22	42	83
Water Supply	21	179	23	45	131	200
Waste Water Disposal	30	253	59	108	116	283
Solid Waste Management	14	47	31	19	11	61
Total	**112**	**515**	**133**	**193**	**300**	**627**
RECREATION AND CULTURE						
Recreational Facilities	11	29	7	12	21	40
Arts / Library	23	4	11	5	11	26
Historic Resources	9	11	5	7	8	20
Total	**43**	**43**	**23**	**24**	**40**	**86**
ENVIRONMENT						
Storm Water Management	14	49	10	15	38	63
Shore and River Protection	5	6	3	6	2	12
Sensitive Land and Water	6	6	3	1	8	12
Open Space	4	10	7	4	3	14
Air Pollution	2	1	-	2	1	3
Total	**31**	**73**	**24**	**28**	**53**	**104**
OVERALL TOTAL	**1,943**	**1,922**	**537**	**996**	**2,332**	**3,865**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-5
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
WACCAMAW REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	1,413	759	185	408	1,579	2,172
Bridges	152	6	3	15	140	158
Public Transportation	97	33	15	34	81	130
Freight (Rail and Road)	16	4	3	9	8	20
Ports/Maritime Activities	8	2	2	4	4	10
Aviation (Including Air Freight)	-	68	13	20	35	68
Other Transportation Facilities	1	-	-	-	1	1
Total	**1,687**	**872**	**221**	**490**	**1,847**	**2,559**
COMMERCE						
Economic Development	147	32	20	6	153	179
Farmland Retention	4	1	3	1	1	5
Energy	17	7	1	10	12	23
Telecommunications	62	-	2	16	44	62
Total	**229**	**40**	**27**	**32**	**210**	**269**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	45	88	17	12	104	133
Justice (Courts)	6	23	5	10	14	29
Public Admin./ Instit./ Hsg.	12	34	8	7	32	47
Total	**63**	**145**	**29**	**28**	**150**	**208**
EDUCATION						
Public Education	91	737	201	236	391	828
Higher Education	11	80	4	14	73	91
Total	**102**	**817**	**205**	**250**	**464**	**919**
HEALTH						
Public Health Care	48	36	18	22	44	83
Water Supply	8	195	21	37	146	203
Waste Water Disposal	57	192	24	61	164	248
Solid Waste Management	15	37	21	15	16	52
Total	**127**	**459**	**84**	**134**	**368**	**586**
RECREATION AND CULTURE						
Recreational Facilities	14	36	5	11	34	50
Arts / Library	27	3	10	4	17	30
Historic Resources	14	21	4	9	22	35
Total	**55**	**60**	**19**	**23**	**73**	**115**
ENVIRONMENT						
Storm Water Management	22	59	9	19	53	81
Shore and River Protection	88	20	15	58	35	108
Sensitive Land and Water	15	21	3	1	32	36
Open Space	4	14	7	4	8	18
Air Pollution	1	2	1	1	1	4
Total	**131**	**117**	**35**	**84**	**129**	**247**
OVERALL TOTAL	**2,394**	**2,510**	**620**	**1,042**	**3,242**	**4,904**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-6
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
LOWCOUNTRY REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	674	469	107	329	707	1,143
Bridges	183	-	18	18	147	183
Public Transportation	52	5	9	16	32	57
Freight (Rail and Road)	8	3	3	5	3	11
Ports/Maritime Activities	137	19	32	62	62	156
Aviation (Including Air Freight)	242	137	77	114	188	379
Other Transportation Facilities	1	-	-	-	1	1
Total	**1,297**	**633**	**246**	**544**	**1,140**	**1,930**
COMMERCE						
Economic Development	125	27	11	15	126	152
Farmland Retention	4	2	3	1	2	6
Energy	11	3	1	7	6	14
Telecommunications	37	3	2	13	25	40
Total	**177**	**35**	**17**	**36**	**159**	**212**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	26	49	13	10	52	75
Justice (Courts)	7	18	5	3	17	25
Public Admin./ Instit./ Hsg.	9	26	7	4	24	34
Total	**42**	**93**	**25**	**17**	**93**	**135**
EDUCATION						
Public Education	48	417	120	120	225	465
Higher Education	34	46	4	12	64	80
Total	**82**	**463**	**124**	**132**	**289**	**545**
HEALTH						
Public Health Care	50	38	12	13	63	88
Water Supply	6	129	14	24	97	135
Waste Water Disposal	141	116	34	55	168	257
Solid Waste Management	11	34	21	15	9	45
Total	**208**	**317**	**81**	**107**	**337**	**525**
RECREATION AND CULTURE						
Recreational Facilities	25	63	14	18	56	87
Arts / Library	5	9	4	2	8	14
Historic Resources	8	9	4	6	8	17
Total	**38**	**81**	**22**	**26**	**71**	**119**
ENVIRONMENT						
Storm Water Management	12	37	6	11	32	49
Shore and River Protection	81	40	18	62	40	120
Sensitive Land and Water	22	33	2	2	51	55
Open Space	2	7	5	2	3	10
Air Pollution	1	1	-	1	1	2
Total	**119**	**119**	**31**	**78**	**127**	**236**
OVERALL TOTAL	**1,963**	**1,740**	**546**	**940**	**2,216**	**3,702**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-7
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
LOWER SAVANNAH REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	959	614	201	644	728	1,573
Bridges	144	2	17	18	111	146
Public Transportation	48	6	12	22	19	54
Freight (Rail and Road)	19	6	4	10	10	24
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	-	14	3	3	8	14
Other Transportation Facilities	1	-	-	-	1	1
Total	**1,171**	**641**	**237**	**697**	**878**	**1,812**
COMMERCE						
Economic Development	63	18	8	6	66	81
Farmland Retention	4	1	4	1	1	5
Energy	48	4	4	28	20	52
Telecommunications	58	-	3	19	36	58
Total	**172**	**24**	**19**	**54**	**123**	**196**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	62	124	19	11	156	186
Justice (Courts)	12	36	5	12	30	48
Public Admin./ Instit./ Hsg.	9	27	6	13	17	36
Total	**83**	**186**	**31**	**36**	**203**	**270**
EDUCATION						
Public Education	56	459	140	140	235	515
Higher Education	241	81	16	60	246	322
Total	**297**	**540**	**156**	**200**	**481**	**837**
HEALTH						
Public Health Care	57	42	25	32	42	99
Water Supply	2	164	28	48	90	166
Waste Water Disposal	37	167	48	55	101	204
Solid Waste Management	19	57	42	22	12	76
Total	**115**	**430**	**144**	**157**	**244**	**545**
RECREATION AND CULTURE						
Recreational Facilities	13	42	7	21	27	55
Arts / Library	11	14	8	4	11	24
Historic Resources	12	14	6	13	8	27
Total	**36**	**70**	**21**	**38**	**46**	**106**
ENVIRONMENT						
Storm Water Management	20	54	11	29	35	74
Shore and River Protection	1	10	1	4	6	11
Sensitive Land and Water	4	5	4	2	4	9
Open Space	4	10	8	4	3	14
Air Pollution	3	2	1	2	1	5
Total	**32**	**81**	**24**	**41**	**48**	**113**
OVERALL TOTAL	**1,906**	**1,972**	**632**	**1,223**	**2,024**	**3,878**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-8
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
CENTRAL MIDLANDS REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	1,829	1,228	547	640	1,870	3,057
Bridges	153	11	17	35	113	164
Public Transportation	150	61	38	75	98	211
Freight (Rail and Road)	49	14	13	30	20	63
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	42	17	12	17	30	59
Other Transportation Facilities	2	1	1	-	2	3
Total	**2,225**	**1,332**	**627**	**797**	**2,133**	**3,557**
COMMERCE						
Economic Development	133	29	15	11	135	161
Farmland Retention	7	3	8	1	1	10
Energy	47	16	2	36	25	64
Telecommunications	280	2	12	88	182	282
Total	**467**	**50**	**37**	**136**	**344**	**517**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	66	124	29	24	136	189
Justice (Courts)	35	50	19	18	48	85
Public Admin./ Instit./ Hsg.	50	70	26	17	77	120
Total	**151**	**244**	**74**	**59**	**261**	**395**
EDUCATION						
Public Education	118	984	295	295	512	1,102
Higher Education	1,113	67	59	177	944	1,180
Total	**1,231**	**1,051**	**354**	**472**	**1,456**	**2,282**
HEALTH						
Public Health Care	134	89	46	52	125	223
Water Supply	6	423	64	137	228	429
Waste Water Disposal	34	400	94	114	225	434
Solid Waste Management	42	95	65	47	25	137
Total	**215**	**1,007**	**269**	**351**	**603**	**1,223**
RECREATION AND CULTURE						
Recreational Facilities	19	65	14	27	43	84
Arts / Library	22	95	38	21	58	117
Historic Resources	45	12	18	24	15	58
Total	**86**	**172**	**70**	**72**	**116**	**258**
ENVIRONMENT						
Storm Water Management	46	107	24	41	88	153
Shore and River Protection	4	10	2	7	5	14
Sensitive Land and Water	17	9	9	3	14	26
Open Space	12	22	21	8	5	34
Air Pollution	5	2	1	3	2	7
Total	**83**	**151**	**57**	**63**	**114**	**234**
OVERALL TOTAL	**4,459**	**4,006**	**1,488**	**1,950**	**5,028**	**8,466**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-9
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
SANTEE LYNCHES REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	633	322	124	307	524	955
Bridges	108	2	2	17	92	110
Public Transportation	36	5	9	17	14	40
Freight (Rail and Road)	10	3	3	6	3	13
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	4	6	2	5	3	10
Other Transportation Facilities	-	-	-	-	-	-
Total	**790**	**337**	**140**	**352**	**636**	**1,128**
COMMERCE						
Economic Development	77	13	9	3	78	90
Farmland Retention	3	1	3	-	-	4
Energy	16	4	1	14	5	20
Telecommunications	29	-	2	13	14	30
Total	**125**	**18**	**15**	**31**	**97**	**143**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	32	64	18	6	71	96
Justice (Courts)	8	23	3	5	22	31
Public Admin./ Instit./ Hsg.	4	12	6	5	4	15
Total	**43**	**98**	**27**	**17**	**98**	**142**
EDUCATION						
Public Education	32	250	80	80	122	282
Higher Education	47	13	3	9	48	60
Total	**79**	**263**	**83**	**89**	**170**	**342**
HEALTH						
Public Health Care	25	19	15	15	15	44
Water Supply	2	107	20	33	56	109
Waste Water Disposal	57	95	30	42	79	151
Solid Waste Management	11	40	27	18	6	51
Total	**95**	**261**	**92**	**108**	**156**	**356**
RECREATION AND CULTURE						
Recreational Facilities	5	14	4	7	9	20
Arts / Library	13	16	4	3	22	28
Historic Resources	7	10	4	7	6	17
Total	**26**	**40**	**12**	**16**	**37**	**65**
ENVIRONMENT						
Storm Water Management	9	27	6	11	19	36
Shore and River Protection	4	6	1	3	6	10
Sensitive Land and Water	3	7	3	2	6	10
Open Space	4	8	6	3	3	12
Air Pollution	1	1	-	2	-	2
Total	**21**	**49**	**16**	**20**	**34**	**70**
OVERALL TOTAL	**1,179**	**1,067**	**386**	**632**	**1,229**	**2,246**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-10
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
APPALACHIAN REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	2,394	2,360	951	1,141	2,662	4,754
Bridges	371	72	47	60	336	443
Public Transportation	184	115	61	126	112	299
Freight (Rail and Road)	64	18	19	38	26	83
Ports/Maritime Activities	-	-	-	-	-	-
Aviation (Including Air Freight)	91	82	35	52	86	173
Other Transportation Facilities	4	2	2	1	2	5
Total	**3,108**	**2,649**	**1,114**	**1,418**	**3,224**	**5,757**
COMMERCE						
Economic Development	506	110	86	19	511	616
Farmland Retention	13	5	13	2	2	18
Energy	64	22	6	52	28	86
Telecommunications	342	3	10	131	205	346
Total	**925**	**140**	**114**	**204**	**746**	**1,065**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	90	185	46	67	162	275
Justice (Courts)	13	45	13	34	11	58
Public Admin./ Instit./ Hsg.	14	46	18	19	23	60
Total	**118**	**276**	**78**	**120**	**195**	**393**
EDUCATION						
Public Education	155	1,763	562	562	794	1,918
Higher Education	381	154	27	79	429	535
Total	**536**	**1,917**	**589**	**641**	**1,223**	**2,453**
HEALTH						
Public Health Care	175	130	92	90	123	305
Water Supply	16	547	84	133	347	563
Waste Water Disposal	167	463	105	135	390	630
Solid Waste Management	65	188	137	80	36	253
Total	**423**	**1,329**	**417**	**438**	**896**	**1,751**
RECREATION AND CULTURE						
Recreational Facilities	13	52	13	24	28	65
Arts / Library	82	33	40	22	52	114
Historic Resources	36	62	19	21	58	98
Total	**130**	**147**	**73**	**67**	**138**	**277**
ENVIRONMENT						
Storm Water Management	55	166	38	64	119	221
Shore and River Protection	6	14	5	8	7	20
Sensitive Land and Water	27	28	12	6	37	55
Open Space	17	49	30	15	22	67
Air Pollution	10	4	2	8	3	13
Total	**114**	**261**	**87**	**101**	**188**	**376**
OVERALL TOTAL	**5,354**	**6,719**	**2,473**	**2,989**	**6,610**	**12,072**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

Table I-11
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
BERKELEY-CHARLESTON-DORCHESTER REGION

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	2,642	1,217	492	532	2,835	3,859
Bridges	1,313	2	33	60	1,221	1,314
Public Transportation	141	63	33	67	104	204
Freight (Rail and Road)	43	13	11	24	20	55
Ports/Maritime Activities	1,326	194	304	608	608	1,520
Aviation (Including Air Freight)	32	13	9	13	23	45
Other Transportation Facilities	5	1	1	1	4	6
Total	**5,501**	**1,502**	**883**	**1,305**	**4,815**	**7,003**
COMMERCE						
Economic Development	179	39	19	10	189	218
Farmland Retention	7	3	7	1	1	9
Energy	44	15	3	28	27	58
Telecommunications	304	15	10	91	218	319
Total	**534**	**71**	**40**	**130**	**435**	**605**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	57	114	32	71	67	170
Justice (Courts)	35	76	21	43	47	111
Public Admin./ Instit./ Hsg.	43	97	38	47	55	140
Total	**135**	**286**	**91**	**161**	**169**	**421**
EDUCATION						
Public Education	115	890	275	290	440	1,005
Higher Education	351	51	14	61	327	402
Total	**466**	**940**	**289**	**351**	**767**	**1,407**
HEALTH						
Public Health Care	218	147	117	117	131	365
Water Supply	15	323	42	63	233	338
Waste Water Disposal	155	252	50	74	283	407
Solid Waste Management	39	86	57	42	26	125
Total	**427**	**807**	**266**	**296**	**672**	**1,234**
RECREATION AND CULTURE						
Recreational Facilities	37	103	29	29	82	140
Arts / Library	28	60	28	16	44	87
Historic Resources	89	17	27	46	34	106
Total	**154**	**180**	**83**	**91**	**159**	**333**
ENVIRONMENT						
Storm Water Management	27	109	21	37	78	136
Shore and River Protection	48	53	16	43	42	101
Sensitive Land and Water	19	15	8	4	22	34
Open Space	11	24	19	9	8	35
Air Pollution	5	2	1	4	2	7
Total	**110**	**203**	**65**	**97**	**151**	**313**
OVERALL TOTAL	**7,327**	**3,989**	**1,716**	**2,431**	**7,168**	**11,316**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

SECTION II

PROJECTION OF INFRASTRUCTURE NEEDS WITH ALTERNATIVE MEANS OF PROVISION, TECHNOLOGICAL ADVANCES, AND REGIONALIZATION SAVINGS

PART A

INTRODUCTION TO INFRASTRUCTURE COST REDUCTION

INTRODUCTION

The purpose of the section that follows is to present a detailed estimate of the potential infrastructure cost savings to be found in alternatives to traditional public infrastructure construction, new technologies, and the regionalization of local service delivery.

This section is a continuation of the effort described in Section I, which presented estimates of current and future infrastructure costs in the state of South Carolina. The infrastructure savings estimates enumerated here result from discussions with experts and an examination of current literature. Savings from three general approaches are considered:

1. *Alternatives to traditional construction/approaches:* efficiencies gained by better construction management techniques or novel approaches to problems now solved by standard infrastructure construction.
2. *Technological advances*: savings gained through innovations in electronic and material science.
3. *Regionalization, or sharing of resources*: the estimation of savings resulting from increased cooperation among local providers of infrastructure.

Potential infrastructure savings result both from new ways of maintaining existing infrastructure (rehabilitation) and from new approaches to infrastructure construction to meet existing demand (backlog) or future development (new growth). Similarly, savings could result in the folding of locally provided infrastructure into regional infrastructure packages.

There are seven categories of infrastructure, each composed of three to six subcategories. The categories are: *transportation; commerce; public safety/administration/welfare; education; health; recreation/culture; environment*. For each category of infrastructure, recognized experts were consulted for their views on the nature and magnitude of cost savings that could reasonably be expected in the rehabilitation or construction of infrastructure. Likewise, a current literature review was conducted to further investigate possible savings. Professional judgments were selectively employed to determine estimates. Because the savings strategies are applicable (and averaged) to multiple categories of infrastructure, in certain cases, the potential exists for over- or under-attributing specific savings; therefore, the figures given in these instances should be regarded as approximate. Actual savings may likely be somewhat smaller.

It must be stressed that what follows are *potential* savings that can be realized from innovative strategies for infrastructure provision. These reductions are not assured; they will be realized only from concerted effort and by an openness to innovation on the part of both public officials and private citizens. Indeed, it may be impractical to implement some strategies for specific projects. The importance of this section, and documentation of estimated cost reductions, lies in its usefulness as a tool for policymakers and citizens who wish to encourage productive new thinking in infrastructure planning and provision.

TYPES OF INFRASTRUCTURE COST REDUCTION

Scores of cost reduction ideas were researched and documented in the course of preparing this report. These concepts have been amalgamated into fourteen subgroups based upon their shared characteristics. They are listed in descending order by magnitude of savings that potentially can be realized from their implementation.

I. ALTERNATIVES TO TRADITIONAL CONSTRUCTION/APPROACHES

Savings based upon:

A) New construction management techniques
B) Privatization and public/private partnerships
C) Zoning, building code, and other regulatory modifications

D) Modularization and standardization of construction
E) Improved maintenance programs
F) Solutions that reduce or eliminate infrastructure demand
G) Construction material substitution

II. TECHNOLOGICAL ADVANCES
Savings based upon:
A) Efficiencies garnered from the continuing computerization and telecommunications revolution
B) Development of new composite materials
C) Use of new power supplies
D) New mechanical and electrical devices
E) Advances in environmental bioremediation

III. REGIONALIZATION, OR SHARING OF RESOURCES
Savings based upon:
A) Enhancing the effectiveness of existing infrastructure and programs
B) Reducing the duplication of existing infrastructure

SOURCES OF INFRASTRUCTURE SAVINGS INFORMATION

As indicated previously, the estimates of infrastructure savings shown in this report were garnered from a combination of interviews with experts, and a review of written material. Dozens of sources were considered; one example of each type is listed below.

SOURCES OF INFRASTRUCTURE SAVINGS INFORMATION

Expert Interviews	Examples
Construction industry associations	Richard L. Tucker, Director Construction Industry Institute Austin, TX
Project engineers	U.S. Army Corps of Engineers
Professors of civil engineering	Ric Jensen, Professor Personal communication Texas Water Resources Institute at Texas A&M University
Infrastructure administrators	Ronnie Graves Public Works Administrator of Water and Wastewater Systems Lawton, OK Personal communication December 1996
Printed Material	**Examples**
Journal articles	*Plastics Engineering* "Technology Widens the Threshold" February 1, 1992 Volume 48, Number 2
Federal government publications	"Statewide Coordination Plan." Federal Emergency Management Agency, December 1981. *Design Guidelines for Flood Damage Reduction.*
Public policy research organization publications	"Transferable Development Rights." *Planning Advisory Service Report No. 409.*
State government studies	South Carolina Department of Transportation Report, "Statewide Coordination Plan," 1992.
Academic press	Little, Charles E. *Greenways for America* Baltimore: Johns Hopkins Press, 1990
Unpublished papers	Mokhtarian, Patricia. "The Travel and Urban Form Implications of Telecommunications Technology," Discussion paper for FHWAI LILP Workshop, September 1993
Records of proceedings	"Electric Utility Franchise Management Package" Summary of the proceedings of the 1989 Electric Utility Franchise Conference

In addition, some savings estimates are based on the experience of the study's consultants including: Center for Urban Policy Research, Wilbur Smith Associates, Siemon, Larsen, & Marsh, and Sandstone Environmental Associates, Inc.

At the conclusion of each interview, experts were asked to recommend others in the field who would be familiar with issues concerning infrastructure cost reduction. This "snowball" survey approach proved to be a highly effective strategy, particularly in cases where the original interviewee could offer only limited infrastructure savings information.

Similarly, literature searches were conducted in "chains," whereby bibliographic references of particularly useful publications were consulted to direct future efforts. This method was continued until additional references revealed little or no new information, signaling the exhaustion of printed material on the topic and confirming adequate coverage of the literature. To ensure currency, only material printed since 1990 was considered, with the exception of several classic texts on infrastructure.

As a research supplement, search engines on the World Wide Web were employed to seek relevant posted information. This effort was rewarded with several leads.

I. INFRASTRUCTURE SAVINGS—ALTERNATIVES TO TRADITIONAL CONSTRUCTION/APPROACH

To calculate estimated savings, estimated percentage cost reductions were multiplied by estimated spending for the relevant infrastructure type.

Example: *The expert estimated that the cost savings for substituting PVC and fiberglass pipe in place of ductile iron is 6% of the cost of building a new water supply project. Estimated infrastructure need for water supply totals $1,765 million ($341 million backlog and $1,424 million new growth). A 6% savings of this amount is $106 million. This figure is added to other infrastructure savings generated by this technological advance and appears in the appropriate table below.*

Savings for rehabilitation activities were calculated in a similar fashion, using as the basis for calculation the estimated amount to be spent for rehabilitating the affected infrastructure categories. Likewise, savings generated from the regionalization of locally provided services were calculated on the basis of estimated local spending for affected infrastructure categories.

A. New construction management techniques

The largest single source of potential infrastructure savings arises from the implementation of newly developed construction planning and management techniques. The "Best Practices" referred to in the following tables are a compilation of methods developed by construction industry management experts (see Note 1). Many best practices improve communication and reduce adversity among construction businesses. Since these methods can be applied to virtually all infrastructure categories studied in this report, total potential savings from their implementation can be significant. The Construction Industry Institute's conservative estimate of a less than 4% savings across all infrastructure categories (except those types of infrastructure that would not greatly benefit from such practices—farmland retention, sensitive land and water, open space, and air pollution) yields a total cost reduction of more than $2.2 billion over the next twenty years.

Another significant cost saver is the Design-Build-Operate-Maintain (DBOM) approach to construction projects. This refers to the handling of any project from start to finish, plus maintenance, by a single contractor. Experience has shown that this approach results in significant cost reductions by streamlining project planning and improving communications, and further aids in scheduling compression. It too can be applied to virtually all infrastructure categories. A 1% savings using this approach would result in more than $560 million in cost reductions.

I. INFRASTRUCTURE APPROACH ALTERNATIVES— COST SAVINGS FROM NEW CONSTRUCTION MANAGEMENT TECHNIQUES

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories
Best Practices—construction management and planning component[1]	$ 2,242	Virtually all new infrastructure categories[2] Virtually all rehabilitation infrastructure categories[3]
Design-Build-Operate-Maintain (DBOM) approach to projects	$ 561	Virtually all new infrastructure categories Virtually all rehabilitation infrastructure categories
Implementation of pavement management program	$ 59	Roads rehabilitation ($55) Aviation (including air freight) rehabilitation ($2) Economic development rehabilitation ($1) Freight (rail and road) rehabilitation ($1)
Installing walkways and bikeways during resurfacing efforts	$ 1	Other transportation facilities rehabilitation

Total Savings from New Construction Management Techniques: $2.863 billion

B. Privatization and public/private partnerships

Continuing public financing difficulties at all levels and a reassessment of the role of the private sector in the provision of public goods have brought private-public partnerships to the fore as a strategy for infrastructure provision. Many current government responsibilities could be provided efficiently through the private sector. In this analysis, an estimated 8% savings is applied only to those infrastructure investments that have had recent private enterprise experience in service provision. The potential savings of $2,190 million, therefore, should be considered a conservative estimate.

[1] Refers to construction management and planning, and includes *safety & zero accident techniques* (beginning in the design process, and using team building, drug screening, labor motivation, fall hazard prevention, training, insurance coverage management, and injury cost calculation, thereby reducing insurance premiums, work premiums, and injury leave); *schedule compression* (by cooperative alliances, partnering, minimizing change delays, measuring work progress, reporting and analyzing techniques, scheduling control systems, concurrent engineering, cycle time analysis, scope control, work packaging, and trust building); *constructability sensibility* (improving communication between architects and construction managers); *scope and definition control* (resulting in a system that matches need); *project control for engineering* (installing an effective cost and schedule control system, including obtaining support within the user organization and instituting performance measures); *contract types, clauses, incentive plans* (as well as risk allocation and milestone determination); *modularization and pre-assembly; setting project objectives* (to focus more clearly on scheduling outcomes); *work packaging for project control* (yielding scheduling enhancements); *measuring productivity* (and therefore enhancing it, in part by improving communication between designers and builders); *construction planning for start-up* (close monitoring and use of predictive tools); *total quality management in the construction industry; quality performance management* (such as continuous improvement process programs, quality system applications, tracking the cost of quality, and reducing field work); *project change management* (to minimize costly plan changes); *disputes potential index/alternative disputes resolution* (limiting litigation, predicting contract disputes, resolving disputes in a timely, cost-effective manner); *pre-project planning* (to reduce scheduling and assembly problems); *partnering and strategic alliances* (the building of commitment and shared vision between owners and contractors in the hopes of reducing conflict and litigation); *and organizing for project success* (such as team building exercises and communication improvement between designers and construction managers)—savings that are applicable to virtually all infrastructure categories.

[2] Except farmland retention, sensitive land and water, open space, and air pollution.

[3] Same as above, rehabilitation aspects only.

I. INFRASTRUCTURE APPROACH ALTERNATIVES— COST SAVINGS FROM PRIVATIZATION AND PUBLIC-PRIVATE PARTNERSHIPS

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories	
Public-private partnerships	$ 2,190	Roads	($1,301)
		Public education	($408)
		Economic development	($159)
		Public safety (jails)	($106)
		Public health care	($80)
		Solid waste management	($56)
		Aviation (including air freight)	($45)
		Recreational facilities	($35)
Education vouchers	$ 51	Public education	
Home schooling	$ 51	Public education	
Housing vouchers	$ 41	Public Administration/Institutions/Housing	($31)
		Public Administration/Institutions/ Housing Rehabilitation	($10)

Total Savings from Privatization and Public-Private Partnerships: $2.333 billion

C. Zoning and building code, and other regulatory modifications

Significant savings result from encouraging cooperative relationships between private contractors and regulators. "Partnering with regulatory agencies" could save hundreds of millions of dollars, as could reducing the ever-changing heavy hand of governmental regulations ("increased contractor scheduling flexibility").

Partnering can be applied to all types of infrastructure solutions and therefore has the potential for very large savings—$567 million. "Increased contractor scheduling flexibility," though estimated to have a potential saving of about 1% in affected infrastructure costs, cannot be effectively applied to all infrastructure categories (e.g., farmland retention, sensitive land and water, open space, and air pollution). These exclusions account for the slightly lower ($561 million) savings estimated to result from this improvement.

I. INFRASTRUCTURE APPROACH ALTERNATIVES—COST SAVINGS FROM ZONING/BUILDING CODE AND OTHER REGULATORY MODIFICATIONS

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories	
Partnering with regulatory agencies	$ 567	All new infrastructure categories All rehabilitation infrastructure categories	
Increased contractor scheduling flexibility	$ 561	Virtually all new infrastructure categories Virtually all rehabilitation infrastructure categories	
Rural lands conversion fee	$ 79	Storm water management Sensitive land and water Open space Farmland retention Air pollution	($45) ($17) ($12) ($4) ($1)
Transferable development rights	$ 39	Historic resources Sensitive land and water Open space Farmland retention Air pollution	($14) ($12) ($9) ($3) ($1)
New community planning	$ 29	Recreational facilities Open space Farmland retention Air pollution	($18) ($7) ($3) ($1)
Adaptive-use regulations for historic structures	$ 17	Historic resources	
Taxing impervious surfaces	$ 13	Storm water management	
Inclusion of library or cultural arts facilities in private developments	$ 12	Arts/Library	
Modifying building codes to facilitate rehabilitation	$ 8	Historic resources	
Protecting future airport expansion areas	$ 6	Aviation (including air freight)	
Planning and zoning ordinances	$ 2	Shore and river protection	
Planning for walkways and bikeways with initial road construction	$ 1	Other transportation facilities	

Total Savings from Zoning/Building Code and Other Regulatory Modifications: $1.334 billion

D. Modularization and standardization of the construction process

The benefits associated with the standardization of production are well documented. These procedures ("modularization, structure standardization, and pre-assembly") have come late to the construction industry, but now show great promise as more assembly operations take place in factories rather than on job sites. The greatest impact, naturally, comes to those types of infrastructure that include buildings as a major cost component (see Note 5). Applying a 4% savings yields about a $770 million reduction in spending.

Increased modularization also opens the way to greater mechanization on the job site ("increased on-site mechanization") as construction craftsmanship continues to be automated. Mechanization's benefits can be applied over a broader set of infrastructure than modularization (see Note 4) and thus adds savings of $561 million, even though total savings will be only about 1% if these techniques are implemented completely. Together, these changes could save well over a billion dollars during the twenty-year projection period.

I. INFRASTRUCTURE APPROACH ALTERNATIVES— COST SAVINGS FROM MODULARIZATION AND STANDARDIZATION

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories
Modularization, structure standardization, and preassembly	$ 770	All new infrastructure categories that have the erection of structures as a major cost component[4]
Increased on-site mechanization	$ 561	Virtually all new infrastructure categories Virtually all rehabilitation infrastructure categories

Total Savings from Modularization and Standardization: $1.331 billion

E. Improved maintenance programs

Historically, the public sector has not maintained existing infrastructure properly. There are many demands for taxpayer dollars, and the unglamorous and non-emergency nature of infrastructure maintenance often relegates it to the bottom of the budget. Cities wait for water mains to break before replacing them; road authorities fill potholes as they appear rather than schedule systematic road resurfacing projects; bridges are allowed to decay before their time for want of regular inspections, repairs, and paint. Significant savings could be realized if the political will were harnessed to regularize infrastructure maintenance and repair ("instituting a regular, intensive preventive maintenance program"). Since such a policy ideally can be applied across the board, an estimated 8% reduction across all categories would yield potential savings of more than $1.1 billion to South Carolina.

I. INFRASTRUCTURE APPROACH ALTERNATIVES— COST SAVINGS FROM IMPROVED MAINTENANCE PROGRAM

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories
Instituting a regular, intensive preventive maintenance program	$ 1,127	All rehabilitation infrastructure categories
Comprehensive, not piecemeal rehabilitation	$ 141	All rehabilitation infrastructure categories

Total Savings from Improved Maintenance Programs: $1.268 billion

F. Solutions that reduce or eliminate infrastructure demand

Instituting tolls, electronic or otherwise, for road use during peak traveling hours ("congestion fees") would reduce or eliminate the need for some new roads and bridges, and bring environmental benefits in the form of reduced air pollution, resulting in over $190 million in estimated savings.

The current trend of lengthening offenders' incarceration sentences is proving to be an expensive and possibly counterproductive approach to managing criminal activity. Nonviolent perpetrators could enter into rehabilitation programs rather than stay housed at public expense in overcrowded facilities ("substituting probation, community service..."). Savings will depend on public acceptance of alternatives to incarceration. A middling cost reduction estimate of 9% results in a benefit of about $120 million—a "savings" that is tempered by the fact that funding must be made available for alternate programs and *their* associated infrastructure.

[4] Bridges, freight (rail and road), ports/maritime activities, aviation (including air freight), economic development, energy, telecommunications, public safety (jails), justice (courts), public administration/institutions/housing, public education, higher education, public health care, recreational facilities, and arts/library

I. INFRASTRUCTURE APPROACH ALTERNATIVES— COST SAVINGS FROM REDUCTION OR ELIMINATION OF INFRASTRUCTURE DEMAND

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories	
Congestion fees	$ 191	Roads Bridges Air pollution	($163) ($28) (<$1)
Incarceration alternatives	$ 119	Public safety (jails)	
Increasing HMO membership	$ 90	Public health care	
Pavement damage fees	$ 59	Roads rehabilitation Bridges rehabilitation Freight (rail and road) rehabilitation	($55) ($3) ($1)
Gray water systems	$ 54	Waste water disposal Water supply Waste water disposal rehabilitation Water supply rehabilitation	($22) ($18) ($8) ($6)
Conservation	$ 51	Waste water disposal Water supply Solid waste management Energy Open space	($22) ($18) ($7) ($2) ($2)
Acquiring vacant lands	$ 26	Storm water management Storm water management rehabilitation Shore and river protection Shore and river protection rehabilitation	($13) ($5) ($4) ($4)
User fees for waste collection	$ 18	Solid waste management Open space	($14) ($4)
Floodproofing buildings	$ 13	Storm water management Storm water management rehabilitation Shore and river protection Shore and river protection rehabilitation	($6) ($3) ($2) ($2)
Constructing waste-to-energy generating plants	$ 11	Solid waste management Energy Open space	($7) ($2) ($2)
Intensified recycling efforts	$ 9	Solid waste management Open space	($7) ($2)
Storm water diversion	$ 8	Storm water management Sensitive land and water	($6) ($2)
Techniques to improve public transport vehicle occupancy	$ 8	Public transportation	
Storm water management plan	$ 6	Storm water management	
Substituting pervious for impervious surfaces	$ 6	Storm water management	
System-wide storm water management evaluation	$ 3	Storm water management rehabilitation	
Creation of recreational space through land reclamation	$ 3	Open space Open space rehabilitation	($2) ($1)
Non-litigious dispute resolution	$ 3	Justice (courts)	
Sand dune maintenance	$ 2	Shore and river protection rehabilitation	
Emissions fee	<$ 1	Air pollution Air pollution rehabilitation	(<$1) (<$1)
Air pollution reduction	<$ 1	Air pollution Air pollution rehabilitation	(<$1) (<$1)

Total Savings for Reduction or Elimination of Infrastructure Demand: $0.680 billion

G. Construction material substitution

New types of materials and new ways of arranging them comprise the bulk of the savings resulting from this approach.

Continuing advances in plastics research promise a greater role for these materials in future buildings ("substituting plastics").

Similarly, pre-cast panels ("pre-cast firewall panels") and new types of exteriors ("curtain wall exteriors") will further

decrease building costs. Identical savings estimates are shown for each type of material substitution because each is expected to result in about 1% savings for those types of infrastructure that require the construction of buildings (see Note 5).

I. INFRASTRUCTURE APPROACH ALTERNATIVES— COST SAVINGS FROM SUBSTITUTION OF CONSTRUCTION MATERIALS

Alternative to Traditional Construction/Approach	Total Estimated Savings (millions)	Affected Infrastructure Categories
Substituting plastics	$ 153	All new infrastructure categories that have the erection of buildings as a major cost component[5] All rehabilitation infrastructure categories that have the erection of buildings as a major cost component[6]
Pre-cast firewall panels	$ 153	All new infrastructure categories that have the erection of buildings as a major cost component All rehabilitation infrastructure categories that have the erection of buildings as a major cost component
Curtain wall exteriors	$ 153	All new infrastructure categories that have the erection of buildings as a major cost component All rehabilitation infrastructure categories that have the erection of buildings as a major cost component
Cold-in-place asphalt recycling	$ 58	Roads rehabilitation ($55) Aviation (including air freight) rehabilitation ($2) Freight (rail and road) rehabilitation ($1)
Use of recycled materials in railroad construction	$ 2	Freight (rail and road)

Total Savings from Substitution of Construction Materials: $0.519 billion

II. INFRASTRUCTURE SAVINGS— TECHNOLOGY IMPROVEMENTS

Significant potential savings from technological advances were found in the course of this study. They are clustered into five groups in the tables that follow, in descending order of magnitude.

A. Efficiencies garnered from the continuing computerization and telecommunications revolution

The Best Practices techniques described earlier have an additional technological component that has been separated for presentation here. Included are methods relating to more efficient modeling and materials tracking—techniques that depend on advances in computer technology. (See Note 7.) Full implementation of these practices would result in estimated savings of $567 million, or 1% in each of the affected categories.

Advances in Global Positioning Systems (GPS) have the potential for magnifying the abilities of earth grading machinery. Knowing, for instance, the exact position and attitude of a grading blade at every instant of operation will further automate and make more accurate the process of moving large amounts of earth. Efficiencies will be found in a number of infrastructure types, and are listed in the following table. GPS also makes project planning and design simpler and less uncertain.

Savings will vary among infrastructure types. However, an estimated 1% reduction in each of the categories discussed here captures savings of about $370 million.

The costs involved in monitoring the decay of infrastructure would be greatly lessened with the construction of remote inspection monitoring ("automated, remote, and computerized inspections..."). Monitoring

[5] Only those with *buildings* as a major cost component—public safety (jails), justice (courts), public administration/institutions/housing, public education, higher education, public health care, recreational facilities, and arts/library.
[6] Same as above, rehabilitation component.

would also increase the effectiveness of rehabilitation scheduling. All categories of infrastructure stand to benefit, including farmland retention, sensitive land and water, open space, and air pollution (remote sensing satellites would play a particularly big role here). Savings of about $140 million, or about 1% of the total cost involved in the provision of these services, can be expected.

II. NEW TECHNOLOGIES—COST SAVINGS FROM CONTINUED GROWTH OF COMPUTERIZATION AND TELECOMMUNICATIONS

Technological Advance	Total Estimated Savings (millions)	Affected Infrastructure Categories
Best Practices—technological component[7]	$ 567	All new infrastructure categories All rehabilitation infrastructure categories
Global Positioning Systems, computerized grading, and inclinometers	$ 370	Roads ($163) Roads rehabilitation ($55) Bridges ($28) Waste water disposal ($22) Economic development ($20) Water supply ($18) Ports/marine facilities ($10) Waste water disposal rehabilitation ($8) Ports/marine facilities rehabilitation ($7) Solid waste management ($7) Storm water management ($6) Aviation (including air freight) ($6) Water supply rehabilitation ($6) Storm water management rehabilitation ($3) Freight (rail and road) ($2) Sensitive land and water ($2) Shore and river protection ($2) Shore and river protection rehabilitation ($2) Aviation rehabilitation ($2) Freight (rail and road) rehabilitation ($1) Sensitive land and water rehabilitation (<$1)
Automated, remote, and computerized inspections and monitoring	$ 141	All rehabilitation infrastructure categories
Interactive video	$ 46	Higher education ($27) Public health care ($10) Higher education rehabilitation ($5) Public health care rehabilitation ($4)
Fully electronic libraries	$ 24	Arts/library ($20) Arts/library rehabilitation ($4)
Nondestructive corrosion measurement techniques	$ 20	Waste water disposal rehabilitation ($8) Water supply rehabilitation ($6) Bridges rehabilitation ($3) Storm water management rehabilitation ($3)
Telerobotic equipment	$ 17	Waste water disposal rehabilitation ($8) Water supply rehabilitation ($6) Storm water management rehabilitation ($3)
Electronic monitoring bracelets	$ 13	Public safety (jails)
Ship simulation modeling	$ 10	Ports/marine facilities rehabilitation

Total Savings from Continued Growth of Computerization and Telecommunications: $1.208 billion

[7] Refers to technological advances in construction management and planning, including *materials management* (integrated computer systems that efficiently track all materials with bar code technology); *electronic data interchange/electronic commerce* (contributing to making of a more efficient design process); *automated identification systems/bar coding application* (aids in the tracking of construction materials); *CAD applications/integrated data systems* (which allow for greater job detailing in the manufacturing of construction materials); and *evaluation of design effectiveness* (with the assistance of three-dimensional computer-aided design and automated design technologies)—savings that are applicable to virtually all infrastructure categories.

B. Development of new composite materials

The continuing creation of new composite materials for use in infrastructure construction and rehabilitation is a growing area of potential savings, both from completely new materials ("PVC and fiberglass pipe" and "composite structural engineering materials") or partially recycled waste ("pavement mix advances, including solid waste and pavement reclamation"). The latter technique yields additional savings in solid waste and open space management.

New pipe materials have the largest potential savings in proportional terms, amounting to about 6% of the total cost of affected projects. A full capture of these savings could yield almost $400 million. Pavement mix advances and composite structural materials, though offering only a 1% savings, result in a combined savings of $450 million because of the potential widespread use of such innovations.

II. NEW TECHNOLOGIES— COST SAVINGS FROM NEW COMPOSITE MATERIALS

Technological Advance	Total Estimated Savings (millions)	Affected Infrastructure Categories
PVC and fiberglass pipe	$ 397	Waste water disposal ($133) Economic development ($119) Water supply ($106) Storm water management ($39)
Pavement mix advances, including solid waste and pavement reclamation	$ 258	Roads ($163) Roads rehabilitation ($55) Economic development ($20) Solid waste management ($7) Aviation (including air freight) ($6) Aviation (including air freight) rehabilitation ($2) Open space ($2) Freight (rail and road) ($2) Freight (rail and road) rehabilitation ($1)
Composite structural engineering materials	$ 192	All new infrastructure categories that have the erection of structures as a major cost component
Sliplining	$ 114	Waste water disposal rehabilitation ($55) Water supply rehabilitation ($41) Storm water management rehabilitation ($18)
Trenchless construction equipment	$ 66	Waste water disposal ($22) Economic development ($20) Water supply ($18) Storm water management ($6)
Long-wearing paints	$ 57	All rehabilitation infrastructure categories that have the erection of structures as a major cost component
High-strength concrete	$ 31	Bridges ($28) Bridges rehabilitation ($3)
Fiber-reinforced polymer composites	$ 28	Bridges
Pressed wood chip beams and dent-resistant vinyl siding	$ 9	Public Administration/Institutions/Housing ($9)
Epoxies	$ 8	Waste water disposal rehabilitation
Geotextile fabrics	$ 5	Storm water management rehabilitation ($3) Shore and river protection rehabilitation ($2)
Long-life, corrosion-resistant aluminum decks	$ 3	Bridges rehabilitation
Modular floatables	$ 3	Storm water management rehabilitation
Pozzolans	$ 3	Bridges rehabilitation
Wetland categorization	$ 2	Sensitive land and water
New fabrics	$ 2	Shore and river protection

Total Savings from New Composite Materials: $1.178 billion

C. New mechanical and electrical devices

Advances in the tools and mechanical devices used on construction job sites ("improved tools") should continue to translate into infrastructure cost reductions. Similarly, innovations in regulating indoor atmospheres ("Advances in heating and cooling mechanisms) will likely save millions of dollars. More than $430 million in savings could result, or 1% from both.

II. NEW TECHNOLOGIES— COST SAVINGS FROM NEW MECHANICAL DEVICES

Technological Advance	Total Estimated Savings (millions)	Affected Infrastructure Categories
Improved tools	$ 250	All new infrastructure categories that have the erection of structures as a major cost component All rehabilitation infrastructure categories that have the erection of structures as a major cost component
Advances in heating and cooling mechanisms	$ 186	All new infrastructure categories that have the erection of structures as a major cost component[8] All rehabilitation infrastructure categories that have the erection of structures as a major cost component[9]
Mechanical pavement repair equipment	$ 58	Roads rehabilitation ($55) Aviation (including air freight) rehabilitation ($2) Economic development rehabilitation ($1)
New lead paint removal systems	$ 3	Bridges rehabilitation
Modern timber bridge designs	$ 3	Bridges rehabilitation
Retrofit wet scrubbers	$ 2	Air pollution rehabilitation
New air scrubbers	<$ 1	Air pollution
Hybrid air control systems	<$ 1	Air pollution

Total Savings from New Mechanical Devices: $0.502 billion

D. Use of new power supplies

New advances in the cutting and shaping of steel ("Plasma arc cutting") could shave several hundred million dollars from future infrastructure construction costs. Structural and other steel is found in virtually every major infrastructure project. Thus, though proportionally small in relation to the overall cost of the project, close to a quarter billion dollars in savings could result in an aggressive implementation of plasma arc cutting over the next twenty years.

II. NEW TECHNOLOGIES— COST SAVINGS FROM USE OF NEW POWER SUPPLIES

Technological Advance	Total Estimated Savings (millions)	Affected Infrastructure Categories
Plasma arc cutting	$ 238	All new infrastructure categories that have the erection of structures as a major cost component ($192) Waste water disposal ($22) Water supply ($18) Storm water management ($6)
Cathodic protection	$ 20	Waste water disposal rehabilitation ($8) Water supply rehabilitation ($6) Storm water management rehabilitation ($3) Energy rehabilitation ($2) Economic development rehabilitation ($1)

Total Savings from Use of New Power Supplies: $0.258 billion

[8] Not including bridges, freight (rail and road), ports/maritime activities, energy, or telecommunications, but including historic resources.
[9] Same as above, rehabilitation component

E. Advances in environmental bioremediation

Environmental scientists continually explore ways to use life forms to correct environmental pollution. Engineered plants have been shown to be effective in collecting heavy metals from contaminated soils, and altered bacteria are useful in cleaning water supplies and processing solid waste and waste water. The savings from this new world of bioremediation heavily depends upon how quickly infrastructure managers are willing to accept such novel approaches. Potential savings could amount to nearly $70 million.

II. NEW TECHNOLOGIES— COST SAVINGS FROM ENVIRONMENTAL REMEDIATION

Technological Advance	Total Estimated Savings (millions)	Affected Infrastructure Categories	
Biotreatments	$ 67	Waste water disposal	($22)
		Water supply	($18)
		Water supply rehabilitation	($6)
		Waste water disposal rehabilitation	($8)
		Solid waste management	($7)
		Solid waste management rehabilitation	($4)
		Open space	($2)
Using planted vegetation for erosion control and land reclamation	$ 8	Sensitive land and water	($7)
		Sensitive land and water rehabilitation	($1)

Total Savings from Environmental Remediation: $0.075 billion

III. INFRASTRUCTURE SAVINGS— REGIONALIZATION OR SHARING OF RESOURCES

Although savings from this approach are likely to be minor relative to those generated by infrastructure alternatives and technological advances, regionalization nevertheless has the ability to save South Carolina hundreds of millions of dollars over the coming decades. The benefits result from enhancing the effectiveness of existing infrastructure—increased intermodal planning, for example—and from reducing duplication in infrastructure provision—e.g., linking utility networks. The following tables suggest how this can be accomplished and show the savings in descending order of magnitude.

A. Enhancing the effectiveness of existing infrastructure and programs

Large savings could result from a regional planning approach to linking intermodal transportation. In addition to the obvious environmental benefits of more efficient movement of people and goods, proper planning at the regional level could save millions of dollars by making some transportation infrastructure unnecessary. It is estimated that almost $150 million (2% of estimated local spending) can be saved over the next twenty years if private citizens and public officials seize the proper opportunities.

III. REGIONALIZATION—COST SAVINGS FROM ENHANCED EFFECTIVENESS OF EXISTING INFRASTRUCTURE AND PROGRAMS

Regionalization or Sharing of Resources	Total Estimated Savings (millions)	Affected Infrastructure Categories	
Increased intermodal transportation planning	$ 146	Roads Economic development Aviation (including air freight) Public transportation Ports/maritime facilities Bridges Freight (rail and road)	($124) ($7) ($5) ($4) ($3) ($2) ($1)
Making TDRs transferable across local jurisdictions	$ 27	Sensitive land and water Open space Historic resources Farmland retention Air pollution	($9) ($9) ($8) ($1) (<$1)
Development of controls to preserve water quality by reducing polluted runoff	$ 24	Water supply Storm water management Sensitive land and water Open space	($18) ($5) ($1) ($1)
Making land rehabilitation a multi-level government strategy	$ 12	Storm water management rehabilitation Open space rehabilitation Sensitive land and water rehabilitation Farmland retention rehabilitation	($9) ($2) ($1) (<$1)
Regionalizing economic development planning and spending	$ 11	Economic development	
Implementation of waste prevention programs through exchanges of reusable materials among regional businesses	$ 5	Solid waste management	
Improved public transport occupancy	$ 2	Public transportation	
Regional storm water run-off management solutions	$ 2	Storm water management rehabilitation	
Regional sand dredging and replenishing	$ 1	Shore and river protection rehabilitation	
Regional land acquisition	$ 1	Shore and river protection	
Regionalization of dredging bids	<$ 1	Ports/maritime activities rehabilitation	

Total Savings from Enhanced Effectiveness of Existing Infrastructure and Programs: $0.232 billion

B. Reducing the duplication of existing infrastructure

Duplication of administrative and supply systems abounds when local authorities fail to coordinate their activities with those of neighboring jurisdictions. An estimated $114 million could be trimmed from South Carolina's infrastructure needs over the next twenty years if local utility authorities linked their systems when appropriate. "Thinking regionally" about utility provision could trim about 3% from local utility infrastructure projects.

III. REGIONALIZATION—COST SAVINGS FROM REDUCTION OF DUPLICATING INFRASTRUCTURE

Regionalization or Sharing of Resources	Total Estimated Savings (millions)	Affected Infrastructure Categories	
Linking power and pipeline supply systems when appropriate	$ 114	Water supply Waste water disposal Storm water management Energy	($51) ($48) ($14) ($1)
Sharing diagnostic equipment and its containing structures	$ 4	Public health	
Consolidating high-risk surgery theaters	$ 4	Public health	
Designating regional airports	$ 3	Aviation	
Consolidating transportation services	$ 2	Public transportation	
Linking infrastructure	<$ 1	Economic development rehabilitation	

Total Savings from Reduction of Duplicative Infrastructure: $0.127 billion

SAVINGS RELATED TO DIFFERENT APPROACHES, NEW TECHNOLOGIES, AND REGIONAL SHARING OF INFRASTRUCTURE

The activities discussed in this section can contribute to both broad-based and significant infrastructure cost savings, but they cannot take place without aggressive measures to look into the applicability of these activities to state and local government agencies' current practices.

These innovative activities hold great promise for significant savings in government agencies' infrastructure expenditures. This section has purposefully thrown the public service ball far enough ahead to capture activities that most agencies are *not* doing today.

This section has also emphasized multiple areas of applicability for these creative measures. A specific strategy, such as more active use of navigational satellites, has applicability in multiple categories of infrastructure provision. So, too, do strategies that employ new construction material composites. Bioremediation is a strategy that holds great promise in future environmental remediation efforts.

In summary, the savings posed in this part should be reviewed on an item-by-item basis for applicability to South Carolina government agencies' practices. Where adoption is feasible, procedures should be developed to implement these cost-saving recommendations.

An Infrastructure Research and Development Committee

Other states have found that the establishment of an infrastructure research and development committee to review and determine the applicability/ feasibility of the adoption of the proposed measures to be very helpful. This committee could be composed of professional groups, university technology centers, and knowledgeable individuals from in-state locations where these technologies have been implemented. Each series of recommendations (new technologies, alternative means of provision, and regional sharing) for each category of infrastructure (new growth and rehabilitation) could be evaluated and reported on, and a decision made to consider it for implementation. In this way, there can emerge some estimate of the broad-base effects of technology improvements on the delivery of infrastructure by local and county governments in the state of South Carolina.

This section presents a menu of possible savings. State of South Carolina officials must now pick and choose those they determine to be most applicable to local practice.

CONCLUSIONS AND RECOMMENDATIONS

The coming decades present a challenge to the state of South Carolina and its inclusive counties and regions. Tens of billions of dollars must be found both to meet existing infrastructure needs and to provide critical infrastructure to service the expected increase in population and economic activity. Billions more will be needed for rehabilitation and maintenance. It's a tall order, but one that is achievable. The techniques and strategies described in this report can assist.

I. Alternatives to Traditional Construction/Approaches

Savings based upon:

A) New construction management techniques: **$2.863 billion**

B) Privatization and public-private partnerships: **$2.333 billion**

C) Zoning/ building code and other regulatory modifications: **$1.334 billion**

D) Modularization and standardization: **$1.331 billion**

E) Improved maintenance programs: **$1.268 billion**
F) Reduction or elimination of infrastructure demand: **$0.680 billion**
G) Substitution of construction materials: **$0.519 billion**

II. Technological Advances
Savings based upon:

A) Continuing computerization and the telecommunications revolution: **$1.208 billion**
B) New composite materials: **$1.178 billion**
C) New mechanical devices: **$0.502 billion**
D) Use of new power supplies: **$0.258 billion**
E) Environmental remediation: **$0.075 billion**

III. Regionalization, or Sharing of Resources
Savings based upon:

A) Enhanced effectiveness of existing infrastructure and programs: **$0.232 billion**
B) Reduction of duplicative infrastructure: **$0.27 billion**

TOTAL SAVINGS **$13.906 billion**

If implemented to the fullest degree, the innovations and alternatives documented in this section have the potential for saving nearly 25 percent of future infrastructure costs in South Carolina. *These savings will not be realized without fundamental changes in thinking about infrastructure provision.* With the exception of some technological improvements that are being adopted as national industry standards, infrastructure cost reductions will be the result of a fundamentally political process. Planners, representatives, providers, researchers, and citizens all have a role to play in bringing these savings to fruition. The process of implementation will not be easy, but the rewards in dollars saved and quality of life enhanced are worth the expenditure of effort.

The road to a more prosperous South Carolina can be paved with the cost savings recommended in this section. It is incumbent upon South Carolinians to consider their implementation.

PART B

STATE AND REGIONAL INFRASTRUCTURE SAVINGS

STATE AND REGIONAL INFRASTRUCTURE SAVINGS

State Savings

If implemented in full, the cost saving techniques described in this section have a potential of cutting more than $13.9 billion from South Carolina's infrastructure bill over the next two decades. This amounts to one-quarter of the estimated $56.7 billion price tag associated with erecting the needed infrastructure using current construction standards, methods, and technology.

Savings will vary with type of infrastructure, however, since alternatives, technology, and regionalization benefits vary in magnitude in different types of infrastructure and range from 0% to 30%. Since the savings are applied to categories of differing spending estimates, dollar savings also vary greatly.

Almost three-quarters of the cost reduction—or $10.3 billion—is due to alternatives in construction methods/approaches. The largest savings are in the transportation category of spending. About $4.9 billion could be shaved off the projected $28.8 billion transportation bill. This amounts to a 17% reduction. Most of the savings is in road construction and rehabilitation, with close to $3.9 billion taken off the estimated $21.7 billion cost estimate. Proportionally, however, the largest cost reduction among transportation categories is in aviation (including air freight), where close to a 20% reduction is documented, resulting in a $165 million savings.

Among the major categories of infrastructure, the greatest proportional savings are found in public safety, administration, and welfare, where a 26% cost reduction is documented, translating into $691 million. Within this category, proportional savings are greatest in public safety (jails), with an estimated 30%, or $472 million, cost reduction.

Regional Savings

Of South Carolina's ten regions, the Appalachian region ranks first in population and employment, and is projected to grow by about a quarter in the next twenty years. It is no surprise, then, that this region would register the greatest potential savings—$3 billion from a base of $12 billion. Despite the magnitude of cost reduction, however, the savings as a proportion of spending is 25%, exactly the state average, because the Appalachian region mirrors very closely the infrastructure distribution of the state of South Carolina.

In percentage terms, four regions have slightly greater than average savings. Lower Savannah, Catawba, Pee Dee, Upper Savannah, and Santee Lynches regions all register about a 26% savings. These regions, which surround but do not include the Central Midlands region, have the potential of saving greater than average amounts because of the relative concentration of infrastructure types that stand to benefit the most from alternatives to construction/methods. As a result, they all show disproportionate reductions in public safety, administration, and welfare infrastructure, and in particular public safety (jails) capital spending. In dollar terms, potential savings amount to $977 million in Lower Savannah; $976 million in Catawba; $891 million in Pee Dee; $667 million in Upper Savannah; and $562 million in Santee Lynches region.

Overall, however, the most striking feature about potential savings among regions is how little proportional savings vary.

TOTAL STATE INFRASTRUCTURE SAVINGS

Figure 1
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
STATE TOTAL

Service Area	Original	Savings from Alternatives $	Alternatives %	Technology $	Technology %	Regionalization $	Regionalization %	Final
TRANSPORTATION								
Roads	21,746	3,861	18	762	4	124	1	16,998
Bridges	3,048	411	13	222	7	2	0	2,413
Public Transportation	1,187	141	12	16	1	8	1	1,022
Freight (Rail and Road)	316	50	16	19	6	1	0	246
Ports	1,686	236	14	94	6	3	0	1,352
Aviation (Including Air Freight)	808	165	20	59	7	8	1	576
Other Transportation Facilities	20	4	19	0	1	-	-	16
Total	**28,811**	**4,867**	**17**	**1,173**	**4**	**147**	**1**	**22,623**
COMMERCE								
Economic Development	2,069	412	20	284	14	18	1	1,355
Farmland Retention	72	12	16	1	1	1	2	58
Energy	394	62	16	18	5	1	0	313
Telecommunications	1,317	181	14	53	4	-	-	1,084
Total	**3,852**	**666**	**17**	**355**	**9**	**20**	**1**	**2,810**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	1,567	472	30	92	6	-	-	1,004
Justice (Courts)	485	84	17	24	5	-	-	377
Public Admin./ Instit./ Hsg.	581	135	23	38	7	-	-	408
Total	**2,634**	**691**	**26**	**154**	**6**	**-**	**-**	**1,789**
EDUCATION								
Public Education	7,043	1,664	24	352	5	-	-	5,028
Higher Education	3,175	501	16	190	6	-	-	2,484
Total	**10,218**	**2,164**	**21**	**543**	**5**	**-**	**-**	**7,512**
HEALTH								
Public Health Care	1,394	399	29	84	6	8	1	903
Water Supply	2,350	282	12	276	12	68	3	1,724
Waste Water Disposal	2,992	362	12	360	12	48	2	2,222
Solid Waste Management	1,047	206	20	38	4	5	0	798
Total	**7,783**	**1,248**	**16**	**758**	**10**	**130**	**2**	**5,646**
RECREATION AND CULTURE								
Recreational Facilities	611	153	25	31	5	-	-	428
Arts / Library	477	88	18	48	10	-	-	342
Historic Resources	427	87	20	10	2	8	2	322
Total	**1,516**	**327**	**22**	**88**	**6**	**8**	**1**	**1,092**
ENVIRONMENT								
Storm Water Management	896	201	22	102	11	30	3	562
Shore and River Protection	426	69	16	15	3	2	0	340
Sensitive Land and Water	263	36	14	16	6	11	4	200
Open Space	233	47	20	6	3	12	5	168
Air Pollution	48	7	15	3	7	0	1	37
Total	**1,865**	**360**	**19**	**143**	**8**	**56**	**3**	**1,307**
OVERALL TOTAL	**56,678**	**10,324**	**18**	**3,214**	**6**	**362**	**1**	**42,779**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

REGIONAL INFRASTRUCTURE SAVINGS

Figure 1A
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
UPPER SAVANNAH REGION

		Savings from						
		Alternatives		Technology		Regionalization		
Service Area	Original	$	%	$	%	$	%	Final
TRANSPORTATION								
Roads	1,241	225	18	46	4	4	0	966
Bridges	146	20	14	11	7	0	0	115
Public Transportation	57	6	11	1	1	0	0	49
Freight (Rail and Road)	11	2	16	1	6	0	0	9
Ports	-	-		-		-		-
Aviation (Including Air Freight)	14	3	21	1	7	0	2	10
Other Transportation Facilities	0	0	19	0	1	-	-	0
Total	**1,469**	**256**	17	**59**	4	**5**	0	**1,149**
COMMERCE								
Economic Development	186	37	20	26	14	2	1	122
Farmland Retention	4	1	15	0	1	0	2	4
Energy	29	5	16	1	5	0	0	23
Telecommunications	42	6	13	2	4	-	-	35
Total	**261**	**48**	18	**29**	11	**2**	1	**183**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	116	36	31	7	6	-	-	73
Justice (Courts)	29	5	17	1	5	-	-	23
Public Admin./ Instit./ Hsg.	34	8	23	2	7	-	-	24
Total	**179**	**49**	27	**11**	6	**-**	-	**120**
EDUCATION								
Public Education	224	53	24	11	5	-	-	160
Higher Education	40	6	16	2	6	-	-	31
Total	**264**	**59**	22	**14**	5	**-**	-	**191**
HEALTH								
Public Health Care	44	13	28	3	6	0	1	29
Water Supply	86	11	13	10	12	2	3	63
Waste Water Disposal	141	18	12	17	12	2	1	104
Solid Waste Management	56	11	20	2	4	0	1	43
Total	**328**	**52**	16	**32**	10	**4**	1	**239**
RECREATION AND CULTURE								
Recreational Facilities	30	7	25	1	5	-	-	21
Arts / Library	14	3	18	1	10	-	-	10
Historic Resources	27	6	21	1	2	1	3	20
Total	**71**	**16**	22	**4**	5	**1**	1	**51**
ENVIRONMENT								
Storm Water Management	37	8	22	4	12	1	3	23
Shore and River Protection	22	4	17	1	4	0	1	18
Sensitive Land and Water	17	2	14	1	6	1	5	12
Open Space	14	3	20	0	3	1	5	10
Air Pollution	2	0	13	0	8	0	0	2
Total	**93**	**18**	19	**7**	7	**3**	3	**65**
OVERALL TOTAL	**2,664**	**497**	19	**155**	6	**15**	1	**1,997**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1B
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
PEE DEE REGION

Service Area	Original	Savings from Alternatives $	Alternatives %	Technology $	Technology %	Regionalization $	Regionalization %	Final
TRANSPORTATION								
Roads	1,473	266	18	54	4	5	0	1,148
Bridges	228	31	14	17	7	0	0	180
Public Transportation	52	7	13	1	1	0	0	45
Freight (Rail and Road)	20	3	16	1	6	0	0	15
Ports	-	-		-		-		-
Aviation (Including Air Freight)	33	7	21	2	7	0	1	23
Other Transportation Facilities	0	0	19	0	1	-	-	0
Total	**1,807**	**314**	17	**76**	4	**6**	0	**1,412**
COMMERCE								
Economic Development	219	44	20	30	14	2	1	143
Farmland Retention	5	1	16	0	1	0	2	4
Energy	24	4	16	1	5	0	0	19
Telecommunications	96	14	15	4	4	-	-	78
Total	**345**	**63**	18	**35**	10	**2**	1	**245**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	149	45	30	9	6	-	-	95
Justice (Courts)	37	7	18	2	5	-	-	28
Public Admin./ Instit./ Hsg.	51	12	23	3	7	-	-	36
Total	**236**	**63**	27	**14**	6	**-**	-	**159**
EDUCATION								
Public Education	300	70	23	15	5	-	-	215
Higher Education	105	17	16	6	6	-	-	82
Total	**405**	**87**	21	**21**	5	**-**	-	**297**
HEALTH								
Public Health Care	59	17	29	4	6	0	1	38
Water Supply	121	15	12	14	12	3	3	89
Waste Water Disposal	237	31	13	30	13	3	1	173
Solid Waste Management	191	37	19	7	4	1	1	146
Total	**608**	**101**	17	**55**	9	**7**	1	**445**
RECREATION AND CULTURE								
Recreational Facilities	41	10	24	2	5	-	-	29
Arts / Library	22	4	18	2	10	-	-	16
Historic Resources	23	4	20	1	2	0	2	17
Total	**85**	**18**	22	**5**	6	**0**	1	**62**
ENVIRONMENT								
Storm Water Management	44	10	22	5	11	1	3	28
Shore and River Protection	7	1	13	0	3	0	1	6
Sensitive Land and Water	8	1	13	0	6	0	5	6
Open Space	16	3	20	0	3	1	5	11
Air Pollution	3	0	13	0	8	0	1	2
Total	**78**	**15**	20	**6**	8	**3**	3	**54**
OVERALL TOTAL	**3,565**	**660**	19	**212**	6	**19**	1	**2,674**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1C
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
CATAWBA REGION

Service Area	Original	Savings from Alternatives $	Alternatives %	Technology $	Technology %	Regionalization $	Regionalization %	Final
TRANSPORTATION								
Roads	1,519	274	18	56	4	8	1	1,181
Bridges	159	22	14	12	7	0	0	126
Public Transportation	83	10	12	1	1	1	1	71
Freight (Rail and Road)	15	2	16	1	6	0	0	12
Ports	-	-		-		-		-
Aviation (Including Air Freight)	13	3	20	1	7	0	2	9
Other Transportation Facilities	1	0	18	0	1	-	-	1
Total	**1,790**	**311**	17	**71**	4	**9**	1	**1,399**
COMMERCE								
Economic Development	167	33	20	23	14	1	1	109
Farmland Retention	5	1	16	0	1	0	2	4
Energy	23	4	16	1	5	0	0	18
Telecommunications	43	6	14	2	4	-	-	35
Total	**238**	**44**	18	**26**	11	**2**	1	**167**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	178	56	31	11	6	-	-	112
Justice (Courts)	33	5	17	2	5	-	-	26
Public Admin./ Instit./ Hsg.	43	10	23	3	7	-	-	31
Total	**255**	**71**	28	**15**	6	**-**	-	**169**
EDUCATION								
Public Education	405	99	24	20	5	-	-	287
Higher Education	360	57	16	22	6	-	-	282
Total	**765**	**155**	20	**42**	5	**-**	-	**568**
HEALTH								
Public Health Care	83	24	29	5	6	1	1	53
Water Supply	200	24	12	23	12	6	3	147
Waste Water Disposal	283	37	13	35	13	5	2	206
Solid Waste Management	61	12	20	2	4	0	1	47
Total	**627**	**97**	15	**66**	11	**11**	2	**453**
RECREATION AND CULTURE								
Recreational Facilities	40	10	25	2	5	-	-	28
Arts / Library	26	5	18	3	10	-	-	19
Historic Resources	20	4	20	0	2	0	2	15
Total	**86**	**19**	22	**5**	6	**0**	1	**62**
ENVIRONMENT								
Storm Water Management	63	14	23	7	11	2	3	40
Shore and River Protection	12	2	15	0	3	0	1	10
Sensitive Land and Water	12	2	14	1	6	0	4	10
Open Space	14	3	19	0	3	1	5	10
Air Pollution	3	0	15	0	7	0	1	2
Total	**104**	**21**	20	**9**	8	**3**	3	**71**
OVERALL TOTAL	**3,865**	**717**	19	**233**	6	**26**	1	**2,889**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1D
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
WACCAMAW REGION

		Savings from						
		Alternatives		Technology		Regionalization		
Service Area	Original	$	%	$	%	$	%	Final
TRANSPORTATION								
Roads	2,172	381	18	73	3	12	1	1,705
Bridges	158	21	13	11	7	0	0	125
Public Transportation	130	14	11	2	1	1	1	113
Freight (Rail and Road)	20	3	16	1	6	0	0	16
Ports	10	1	14	1	6	0	0	8
Aviation (Including Air Freight)	68	14	20	5	7	1	2	48
Other Transportation Facilities	1	0	18	0	1	-	-	1
Total	**2,559**	**436**	17	**93**	4	**15**	1	**2,015**
COMMERCE								
Economic Development	179	36	20	25	14	2	1	117
Farmland Retention	5	1	16	0	1	0	2	4
Energy	23	4	15	1	4	0	1	19
Telecommunications	62	8	13	2	4	-	-	51
Total	**269**	**48**	18	**28**	10	**2**	1	**191**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	133	41	31	8	6	-	-	84
Justice (Courts)	29	5	17	1	5	-	-	22
Public Admin./ Instit./ Hsg.	47	11	23	3	7	-	-	33
Total	**208**	**57**	27	**12**	6	**-**	-	**139**
EDUCATION								
Public Education	828	195	24	41	5	-	-	592
Higher Education	91	14	16	5	6	-	-	71
Total	**919**	**210**	23	**47**	5	**-**	-	**663**
HEALTH								
Public Health Care	83	24	29	5	6	1	1	54
Water Supply	203	23	11	23	12	6	3	150
Waste Water Disposal	248	30	12	30	12	4	2	185
Solid Waste Management	52	10	20	2	4	0	1	39
Total	**586**	**87**	15	**60**	10	**12**	2	**428**
RECREATION AND CULTURE								
Recreational Facilities	50	13	25	3	5	-	-	35
Arts / Library	30	6	18	3	10	-	-	22
Historic Resources	35	7	21	1	2	1	3	26
Total	**115**	**25**	22	**6**	5	**1**	1	**82**
ENVIRONMENT								
Storm Water Management	81	18	23	9	11	3	3	51
Shore and River Protection	108	18	17	4	4	0	0	86
Sensitive Land and Water	36	5	14	2	6	2	5	27
Open Space	18	4	20	1	3	1	6	13
Air Pollution	4	1	16	0	6	0	3	3
Total	**247**	**46**	19	**16**	6	**6**	2	**180**
OVERALL TOTAL	**4,904**	**909**	19	**263**	5	**35**	1	**3,698**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1E
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
LOWCOUNTRY REGION

		Savings from						
		Alternatives		Technology		Regionalization		
Service Area	Original	$	%	$	%	$	%	Final
TRANSPORTATION								
Roads	1,143	204	18	41	4	7	1	891
Bridges	183	25	13	13	7	-	-	145
Public Transportation	57	6	11	1	1	0	0	50
Freight (Rail and Road)	11	2	16	1	6	0	0	9
Ports	156	22	14	9	6	0	0	125
Aviation (Including Air Freight)	379	77	20	28	7	3	1	271
Other Transportation Facilities	1	0	18	0	1	-	-	1
Total	**1,930**	**336**	**17**	**92**	**5**	**10**	**1**	**1,491**
COMMERCE								
Economic Development	152	30	20	20	13	1	1	100
Farmland Retention	6	1	16	0	1	0	2	5
Energy	14	2	15	1	4	0	0	11
Telecommunications	40	5	14	2	4	-	-	33
Total	**212**	**39**	**18**	**23**	**11**	**1**	**1**	**150**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	75	23	30	4	6	-	-	48
Justice (Courts)	25	4	16	1	5	-	-	20
Public Admin./ Instit./ Hsg.	34	8	23	2	7	-	-	24
Total	**135**	**35**	**26**	**8**	**6**	**-**	**-**	**92**
EDUCATION								
Public Education	465	110	24	23	5	-	-	331
Higher Education	80	13	16	5	6	-	-	63
Total	**545**	**123**	**23**	**28**	**5**	**-**	**-**	**394**
HEALTH								
Public Health Care	88	27	30	5	6	1	1	56
Water Supply	135	15	11	16	12	4	3	100
Waste Water Disposal	257	30	12	31	12	3	1	194
Solid Waste Management	45	9	20	2	4	0	1	35
Total	**525**	**81**	**15**	**53**	**10**	**8**	**1**	**384**
RECREATION AND CULTURE								
Recreational Facilities	87	22	26	4	5	-	-	61
Arts / Library	14	3	18	1	10	-	-	10
Historic Resources	17	4	20	0	2	0	3	13
Total	**119**	**28**	**24**	**6**	**5**	**0**	**0**	**84**
ENVIRONMENT								
Storm Water Management	49	11	23	5	11	2	3	31
Shore and River Protection	120	20	17	4	4	0	0	95
Sensitive Land and Water	55	8	14	3	6	3	5	42
Open Space	10	2	21	0	3	1	6	7
Air Pollution	2	0	14	0	7	0	1	2
Total	**236**	**41**	**17**	**13**	**6**	**5**	**2**	**176**
OVERALL TOTAL	**3,702**	**683**	**18**	**223**	**6**	**25**	**1**	**2,771**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1F
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
LOWER SAVANNAH REGION

		Savings from						
		Alternatives		Technology		Regionalization		
Service Area	Original	$	%	$	%	$	%	Final
TRANSPORTATION								
Roads	1,573	287	18	60	4	7	0	1,219
Bridges	146	20	14	11	7	0	0	115
Public Transportation	54	7	12	1	1	0	0	46
Freight (Rail and Road)	24	4	15	1	6	0	0	19
Ports	-	-		-		-		-
Aviation (Including Air Freight)	14	3	21	1	7	0	2	10
Other Transportation Facilities	1	0	18	0	1	-	-	1
Total	**1,812**	**320**	**18**	**74**	**4**	**8**	**0**	**1,410**
COMMERCE								
Economic Development	81	16	20	11	13	1	1	53
Farmland Retention	5	1	16	0	1	0	2	4
Energy	52	8	16	2	5	0	0	42
Telecommunications	58	8	14	2	4	-	-	48
Total	**196**	**33**	**17**	**16**	**8**	**1**	**1**	**147**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	186	58	31	11	6	-	-	117
Justice (Courts)	48	8	17	2	5	-	-	37
Public Admin./ Instit./ Hsg.	36	9	24	2	6	-	-	25
Total	**270**	**75**	**28**	**16**	**6**	**-**	**-**	**179**
EDUCATION								
Public Education	515	122	24	26	5	-	-	367
Higher Education	322	51	16	19	6	-	-	251
Total	**837**	**173**	**21**	**45**	**5**	**-**	**-**	**619**
HEALTH								
Public Health Care	99	28	28	6	6	1	1	65
Water Supply	166	20	12	20	12	5	3	121
Waste Water Disposal	204	25	12	25	12	4	2	151
Solid Waste Management	76	15	20	3	4	0	1	57
Total	**545**	**88**	**16**	**53**	**10**	**9**	**2**	**394**
RECREATION AND CULTURE								
Recreational Facilities	55	13	24	3	5	-	-	39
Arts / Library	24	4	18	2	10	-	-	17
Historic Resources	27	5	20	1	2	1	2	20
Total	**106**	**23**	**22**	**6**	**6**	**1**	**0**	**76**
ENVIRONMENT								
Storm Water Management	74	16	22	9	12	3	4	46
Shore and River Protection	11	2	15	0	3	0	1	9
Sensitive Land and Water	9	1	13	1	6	0	4	7
Open Space	14	3	20	0	3	1	5	10
Air Pollution	5	1	15	0	7	0	1	4
Total	**113**	**23**	**20**	**10**	**9**	**4**	**3**	**76**
OVERALL TOTAL	**3,878**	**735**	**19**	**220**	**6**	**22**	**1**	**2,901**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1G
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
CENTRAL MIDLANDS REGION

		Savings from						
		Alternatives		Technology		Regionalization		
Service Area	Original	$	%	$	%	$	%	Final
TRANSPORTATION								
Roads	3,057	539	18	105	3	19	1	2,395
Bridges	164	23	14	12	8	0	0	128
Public Transportation	211	25	12	3	1	2	1	182
Freight (Rail and Road)	63	10	16	4	6	0	0	49
Ports	-	-		-		-		-
Aviation (Including Air Freight)	59	12	20	4	7	0	1	42
Other Transportation Facilities	3	1	17	0	1	-	-	3
Total	**3,557**	**610**	**17**	**128**	**4**	**22**	**1**	**2,798**
COMMERCE								
Economic Development	161	32	20	22	14	1	1	106
Farmland Retention	10	2	16	0	1	0	2	8
Energy	64	10	16	3	5	0	0	51
Telecommunications	282	38	14	11	4	-	-	232
Total	**517**	**82**	**16**	**36**	**7**	**2**	**0**	**397**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	189	58	30	11	6	-	-	121
Justice (Courts)	85	14	17	4	5	-	-	66
Public Admin./ Instit./ Hsg.	120	27	23	8	7	-	-	85
Total	**395**	**99**	**25**	**23**	**6**	**-**	**-**	**272**
EDUCATION								
Public Education	1,102	261	24	55	5	-	-	786
Higher Education	1,180	186	16	71	6	-	-	923
Total	**2,282**	**447**	**20**	**126**	**6**	**-**	**-**	**1,709**
HEALTH								
Public Health Care	223	65	29	13	6	1	1	143
Water Supply	429	54	13	51	12	12	3	313
Waste Water Disposal	434	53	12	52	12	9	2	320
Solid Waste Management	137	27	20	5	4	1	0	104
Total	**1,223**	**198**	**16**	**122**	**10**	**22**	**2**	**880**
RECREATION AND CULTURE								
Recreational Facilities	84	21	25	4	5	-	-	59
Arts / Library	117	21	18	12	10	-	-	84
Historic Resources	58	11	20	1	2	0	1	44
Total	**258**	**54**	**21**	**17**	**7**	**0**	**0**	**187**
ENVIRONMENT								
Storm Water Management	153	34	22	17	11	5	3	96
Shore and River Protection	14	2	16	0	3	0	1	11
Sensitive Land and Water	26	3	14	2	6	1	3	20
Open Space	34	7	20	1	3	2	5	25
Air Pollution	7	1	16	0	6	0	1	5
Total	**234**	**48**	**21**	**21**	**9**	**7**	**3**	**158**
OVERALL TOTAL	**8,466**	**1,537**	**18**	**473**	**6**	**54**	**1**	**6,401**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1H
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
SANTEE LYNCHES REGION

Service Area	Original	Savings from Alternatives $	Alternatives %	Technology $	Technology %	Regionalization $	Regionalization %	Final
TRANSPORTATION								
Roads	955	172	18	35	4	4	0	744
Bridges	110	15	14	8	7	0	0	86
Public Transportation	40	5	12	1	1	0	0	35
Freight (Rail and Road)	13	2	16	1	6	0	0	10
Ports	-	-		-		-		-
Aviation (Including Air Freight)	10	2	20	1	7	0	1	7
Other Transportation Facilities	0	0	18	0	1	-	-	0
Total	**1,128**	**196**	17	**45**	4	**5**	0	**883**
COMMERCE								
Economic Development	90	18	20	12	14	1	1	59
Farmland Retention	4	1	16	0	1	0	2	3
Energy	20	3	16	1	5	0	0	16
Telecommunications	30	4	14	1	4	-	-	24
Total	**143**	**26**	18	**15**	10	**1**	1	**102**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	96	30	31	6	6	-	-	60
Justice (Courts)	31	5	17	2	5	-	-	24
Public Admin./ Instit./ Hsg.	15	4	24	1	6	-	-	11
Total	**142**	**39**	27	**8**	6	**-**	-	**95**
EDUCATION								
Public Education	282	66	24	14	5	-	-	201
Higher Education	60	9	16	4	6	-	-	47
Total	**342**	**76**	22	**18**	5	**-**	-	**248**
HEALTH								
Public Health Care	44	12	28	3	6	0	1	29
Water Supply	109	14	12	13	12	3	3	80
Waste Water Disposal	151	19	12	18	12	2	1	113
Solid Waste Management	51	10	20	2	4	0	1	39
Total	**356**	**54**	15	**36**	10	**6**	2	**260**
RECREATION AND CULTURE								
Recreational Facilities	20	5	25	1	5	-	-	14
Arts / Library	28	5	18	3	10	-	-	20
Historic Resources	17	3	20	0	2	0	2	13
Total	**65**	**13**	21	**4**	6	**0**	1	**47**
ENVIRONMENT								
Storm Water Management	36	8	22	4	12	1	3	23
Shore and River Protection	10	1	14	0	3	0	1	8
Sensitive Land and Water	10	1	13	1	6	1	5	8
Open Space	12	2	20	0	3	1	5	8
Air Pollution	2	0	13	0	8	0	1	2
Total	**70**	**13**	19	**6**	8	**2**	3	**49**
OVERALL TOTAL	**2,246**	**418**	19	**131**	6	**14**	1	**1,684**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1I
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
APPALACHIAN REGION

		Savings from						
		Alternatives		Technology		Regionalization		
Service Area	Original	$	%	$	%	$	%	Final
TRANSPORTATION								
Roads	4,754	842	18	165	3	36	1	3,710
Bridges	443	61	14	33	7	1	0	348
Public Transportation	299	37	12	4	1	3	1	255
Freight (Rail and Road)	83	13	16	5	6	0	0	65
Ports	-	-		-		-		-
Aviation (Including Air Freight)	173	35	20	13	7	2	1	123
Other Transportation Facilities	5	1	22	0	1	-	-	4
Total	**5,757**	**989**	17	**220**	4	**42**	1	**4,505**
COMMERCE								
Economic Development	616	123	20	85	14	5	1	403
Farmland Retention	18	3	16	0	1	0	2	14
Energy	86	14	16	4	5	0	0	68
Telecommunications	346	48	14	14	4	-	-	284
Total	**1,065**	**187**	18	**103**	10	**6**	1	**769**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	275	80	29	16	6	-	-	179
Justice (Courts)	58	11	18	3	5	-	-	44
Public Admin./ Instit./ Hsg.	60	14	24	4	6	-	-	42
Total	**393**	**105**	27	**23**	6	**-**	-	**266**
EDUCATION								
Public Education	1,918	451	24	96	5	-	-	1,371
Higher Education	535	84	16	32	6	-	-	419
Total	**2,453**	**536**	22	**128**	5	**-**	-	**1,790**
HEALTH								
Public Health Care	305	87	28	18	6	2	1	198
Water Supply	563	67	12	66	12	17	3	413
Waste Water Disposal	630	74	12	75	12	11	2	470
Solid Waste Management	253	50	20	9	4	1	1	193
Total	**1,751**	**278**	16	**168**	10	**31**	2	**1,275**
RECREATION AND CULTURE								
Recreational Facilities	65	16	24	3	5	-	-	46
Arts / Library	114	21	18	11	10	-	-	82
Historic Resources	98	21	21	2	2	3	3	72
Total	**277**	**57**	21	**17**	6	**3**	1	**200**
ENVIRONMENT								
Storm Water Management	221	50	22	25	11	8	3	139
Shore and River Protection	20	3	15	1	3	0	1	16
Sensitive Land and Water	55	7	14	3	6	2	4	42
Open Space	67	13	20	2	3	4	5	48
Air Pollution	13	2	15	1	7	0	1	10
Total	**376**	**76**	20	**32**	9	**14**	4	**255**
OVERALL TOTAL	**12,072**	**2,228**	18	**691**	6	**95**	1	**9,059**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 1J
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
BERKELEY-CHARLESTON-DORCHESTER REGION

		Savings from						
		Alternatives		*Technology*		*Regionalization*		
Service Area	*Original*	*$*	*%*	*$*	*%*	*$*	*%*	*Final*
TRANSPORTATION								
Roads	3,859	672	17	126	3	21	1	3,039
Bridges	1,314	174	13	94	7	0	0	1,046
Public Transportation	204	24	12	3	1	2	1	176
Freight (Rail and Road)	55	9	16	3	6	0	0	43
Ports	1,520	213	14	85	6	3	0	1,219
Aviation (Including Air Freight)	45	9	20	3	7	0	1	32
Other Transportation Facilities	6	1	18	0	1	-	-	5
Total	**7,003**	**1,101**	**16**	**315**	**4**	**26**	**0**	**5,561**
COMMERCE								
Economic Development	218	43	20	30	14	2	1	143
Farmland Retention	9	2	16	0	1	0	2	8
Energy	58	9	15	3	4	0	0	47
Telecommunications	319	43	13	13	4	-	-	263
Total	**605**	**97**	**16**	**45**	**7**	**2**	**0**	**460**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	170	46	27	10	6	-	-	115
Justice (Courts)	111	19	18	6	5	-	-	86
Public Admin./ Instit./ Hsg.	140	33	24	9	6	-	-	98
Total	**421**	**99**	**23**	**24**	**6**	**-**	**-**	**298**
EDUCATION								
Public Education	1,005	237	24	50	5	-	-	718
Higher Education	402	63	16	24	6	-	-	315
Total	**1,407**	**300**	**21**	**74**	**5**	**-**	**-**	**1,032**
HEALTH								
Public Health Care	365	103	28	22	6	2	1	239
Water Supply	338	39	11	39	12	11	3	249
Waste Water Disposal	407	47	11	48	12	6	2	306
Solid Waste Management	125	24	20	5	4	1	0	95
Total	**1,234**	**213**	**17**	**113**	**9**	**19**	**2**	**889**
RECREATION AND CULTURE								
Recreational Facilities	140	36	26	7	5	-	-	97
Arts / Library	87	16	18	9	10	-	-	63
Historic Resources	106	21	20	3	2	1	1	82
Total	**333**	**73**	**22**	**18**	**5**	**1**	**0**	**242**
ENVIRONMENT								
Storm Water Management	136	30	22	15	11	5	4	85
Shore and River Protection	101	16	16	3	3	1	1	81
Sensitive Land and Water	34	5	14	2	6	1	3	26
Open Space	35	7	20	1	3	2	5	25
Air Pollution	7	1	15	1	7	0	1	6
Total	**313**	**59**	**19**	**22**	**7**	**8**	**3**	**223**
OVERALL TOTAL	**11,316**	**1,941**	**17**	**612**	**5**	**57**	**1**	**8,706**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

SECTION III

COSTS OF SPRAWL SAVINGS RELATED TO TECHNOLOGY REDUCING INFRASTRUCTURE NEEDS AND COSTS

PART A

BACKGROUND TO COSTS OF SPRAWL

THE COSTS OF SPRAWL

INTRODUCTION

The South Carolina Advisory Commission on Intergovernmental Relations (SCACIR) has commissioned a study on infrastructure needs and costs in the state. Projections of infrastructure have been presented and refined by considering technological and infrastructure program advances. (See Section II of this study.) This portion of the study seeks to refine further the costs of infrastructure provision by attempting to alter development patterns to achieve savings related to the costs of sprawl. Implicit in any cost savings noted is a willingness on the part of South Carolina counties to redirect development closer in at "design density" increases while reducing growth farther out and decreasing the density of the growth that does take place.

The report analyzes the differences in resource consumption and *costs* of uncontained versus contained development. The first situation is termed current or *sprawl* development; the second, *compact growth*. These costs will be viewed in four different substantive areas: (1) *infrastructure provision*, (2) *housing costs*, (3) *land consumption*, and (4) *municipal cost-revenue impacts*. The state of South Carolina and its constituent 46 counties and ten regions will be analyzed to determine whether differences in costs result from alternative future development patterns.

The study will review the literature of current development versus compact growth as it relates to the consumption or cost of infrastructure, housing, land, and public services (municipal operating costs). It will then present the results of growth pattern differences throughout the state as they relate to the above four areas of resource consumption.

Nationally, the capital costs of historical and current development patterns have usually been supported by the general population. Over the last decade, however, as new development costs have occurred, land development practice increasingly has shifted these costs to the specific increment of the population that contributed to them. This shifting of responsibility for costs requires a careful look at what contributes to them and whether they can be lessened.

The above discussion is the essence of municipal cost-revenue impacts. Cost-revenue impacts are the *operational*, as opposed to *capital*, costs that occur in municipalities as a function of land development. Operational costs are affected by a variety of factors including the demography of development, size of the unit being developed, income of a unit's occupants, and location and scale of development relative to other development. Thus, variations in operational cost-revenue impacts are not limited to just the pattern of development and, accordingly, are not impacted to the extent that capital costs are.

BACKGROUND

The section that follows discusses differences between current, or sprawl, development and an alternative, managed growth or compact development. These differences result largely from the use of land. In the first case, under *sprawl development*, land is consumed as if it has considerable supply and there is little economic or societal cost in discarding or underusing old land in search of new. This approach to

development often takes land in one-half acre or larger parcels to accommodate detached single-family homes and strip nonresidential centers along the outer beltways and spokes from the core of the metropolitan area. Inner-suburban and urban lands are skipped over en route to rural locations. This pattern is not willful; it has evolved over time from a lack of public awareness that there are societal consequences in consuming land this way. New infrastructure must be built to accommodate a scattered pattern of low-density land uses, yet there is no master blueprint depicting where or in what sequence these lands will be developed.

Another approach to land use, which is potentially more conservative in the use of land, infrastructure, and tax dollars, is *compact development*, or managed growth. This approach selects land closer to existing development, encourages both infill and redevelopment of core lands, and avoids internal development in areas which lack the necessary public facilities and services. When development takes place, natural habitats are buffered, uses are mixed if possible, and both residential and nonresidential uses, even if they exist alone, are clustered. This approach to land use has the potential for mitigating and reducing the impacts of development. It limits overall and fragile land consumption related to development, lowers requirements for road and water/sewer infrastructure, and, if implemented correctly, simultaneously reduces public service costs and housing prices.

CHARACTERISTICS OF SPRAWL AND COMPACT GROWTH

The purpose of examining the literature of sprawl versus compact growth is to classify and analyze what is known about growth management's effect on (1) land consumption, (2) public infrastructure provision, (3) private infrastructure (housing) costs, and (4) cost/revenue impacts (public service costs). Do the patterns of development spawned by compact growth save infrastructure costs? Do they drive up housing costs? Do they reduce the amount of land, including fragile areas, taken for development? Do they have a negative effect on local public service costs?

These four areas of examination are defined as follows. *Land consumption (including natural habitat losses)* involves the use of land to accommodate growth, with the focus on overall quantity of land converted to development uses as well as the conversion of agricultural acreage and the intrusion of development into fragile environmental areas. *Infrastructure, or public capital construction*, refers to the capital improvements necessitated by growth, including roads, utilities, schools, and other facilities (e.g., town hall, fire and rescue stations). *Private capital construction in the form of housing* is typically considered on a cost-per-residential-unit basis for a variety of shelter types, such as single-family detached homes, townhouses, garden units, and the like. *Cost-revenue impacts resulting from the operating costs of development* compare development in areas of excess service capacity with development in locations that would have to expand public services and infrastructure. Cost-revenue impacts

include the longer-run savings in operating costs both regionally and in a single community.

Most studies summarized here contrast two alternative development futures. One alternative represents existing development patterns extended into the future; it is termed current, or *sprawl,* development. Development of this type typically includes subdivision-style residential development and strip nonresidential development consisting of (1) skipped-over, noncontiguous residential land development, in the form of 0.5 to 1.5 acre lots, and (2) nonresidential development of floor-area ratios* of 0.20 or less. Sprawl development continues prior patterns of agricultural and other fragile land consumption, significant road/pavement construction, and high amounts of water and sewer infrastructure provision. Development of this type reportedly contributes to both higher housing costs for new households and negative fiscal impacts to host public service jurisdictions.

Characteristics of Sprawl

Development that is:

- very low density
- automobile dependent
- uneconomical for utility expansion or extension of other public services
- embodied in scattered rural subdivisions
- characterized by strip residential development along county roads
- detrimental to rural character and small town atmosphere
- insensitive to promoting retail shopping opportunities downtown
- in the form of strip commercial development at the edges of town
- land consumptive
- energy inefficient
- characterized by a high ratio of road surface to development served

(Michigan Society of Planning Officials 1995.)

The second alternative is called *compact growth,* or growth management. This type of development seeks to contain most new growth around existing centers and to limit the intensity of development in rural and sensitive environmental areas. It also seeks to save more prime agricultural and fragile lands, prevent wetland encroachment, buffer streams and other water bodies, and protect open water and natural habitats. Further, it seeks to reduce road construction and water/sewer infrastructure provision through more contained cluster development and, in some cases, mixed-use development. Achieving these goals means increasing the share and density of development close to existing development and decreasing the share and density of development in the outer, more rural and undeveloped areas of the county or metropolitan area. Density increases and decreases are planned in a way that does not alter regional housing costs, increase public service outlays, or limit revenues of public service providers.

Characteristics of Compact Growth

Development that is:

- economical in public service provision
- low to moderate density, with some clustering of uses
- characterized by a distinct edge between urban and rural areas

* Floor-area ratio (FAR) is the gross floor area of all buildings or structures on a lot divided by the total lot area.

- typified by farmland, forest, and other natural open spaces surrounding developed areas
- responsive to residents who wish to walk or bike to shopping areas, schools, and public buildings
- sensitive to residential neighborhoods surrounding defined centers
- of a form wherein most commercial development is downtown or in planned clusters

(Michigan Society of Planning Officials 1995.)

COMPACT GROWTH AND ITS RESOURCE SAVINGS AS AN ALTERNATIVE TO SPRAWL

Proponents of compact growth point to the economic savings associated with this type of development. For instance, a Florida study found that "compact, infill, and higher density development is more efficient to serve than scattered, linear, and lower density sprawl" by 10 to 25 percent, according to category of infrastructure provided (Duncan et al. 1989, 21). *The Costs of Sprawl* (Real Estate Research Corporation 1974) reported similar findings more than two decades ago. This study is cited in some of the most current research on sprawl development's disadvantages.

The most comprehensive *recent* assessment of the economies afforded by compact development is that conducted by a team of academic and professional researchers from Rutgers University (Burchell et al. 1992a). This study analyzed the impacts of the then-pending New Jersey State Development and Redevelopment Plan. Findings concluded that the state of New Jersey could save $1.3 billion in infrastructure costs for roads, utilities, and schools over a twenty-year period if a state plan encouraging compact growth were followed rather than continuing the patterns of outward development prevalent at that time.

Capital (Public Infrastructure) Costs: Current Development Trends versus Managed Growth

The land development literature has long been interested in the relationship between land-use patterns and infrastructure costs (Burchell and Listokin 1990, 75). Although there are gaps in what is known, a number of studies support the contention that compact growth, by fostering infill and higher density development, can realize cost savings in capital facility provision. Initially, attention focused on the association between density and on-site capital improvements, such as sidewalks, curbs, local streets, and so on. Not surprisingly, studies showed that the on-site infrastructure outlay per unit would be reduced as density increased, since localized improvements would be "amortized" over a larger number of units. To illustrate, the cost for sidewalks essentially would be halved for single-family detached homes with fifty-foot frontages, compared to those with 100-foot frontages.

Of the several investigations of this topic, three major studies stand out: James Duncan and Associates, The *Search for Efficient Urban Growth Patterns* (1989); the literature synthesis by James E. Frank (1989), *The Costs of Alternative Development Patterns: A Review of the Literature;* and the Rutgers University studies by Robert W. Burchell and others, *Impact Assessment of the New Jersey Interim State Development and Redevelopment Plan* (Burchell et al.

1992a) and *Impact Assessment of the New Jersey Interim State Development and Redevelopment Plan: Supplemental AIPLAN Assessment* (Burchell et al. 1992b). In the South Carolina analysis, the synthesis of infrastructure savings potentially available from managed growth is based on the investigations of Duncan, Frank, and Burchell.

As would be expected, the findings of these three studies differ somewhat. For instance, compact growth allows for a 7 percent school infrastructure savings according to Duncan, whereas Frank and Burchell find 1 percent and 3 percent savings, respectively. The commonalities in the direction and order of magnitude of the findings are much stronger, however, than these individual differences. Among the findings: relative to sprawl development, compact growth requires 75 percent of the infrastructure cost for roads; 95 percent of the infrastructure costs for schools; 85 percent of the infrastructure costs for utilities; and is at rough parity (100 percent) for the "other" capital category.

Capital (Private Housing) Costs: Current Development Trends versus Compact Growth

The growth control studies cited earlier in the literature review analyzed the price effects of growth controls in a given community. What happens to overall housing costs in a larger area governed by growth controls where development is restricted in certain localities (e.g., areas with fragile lands) but encouraged in others (areas with existing or excess infrastructure capacity, such as urban centers or suburban infill locations)? The only study to date that has considered housing affordability under managed growth on a wide geographic basis is the Rutgers University impact assessment (Burchell et. al 1992a, 1992b).

The Burchell Study

Researchers examined the statewide consequences of housing affordability under sprawl development compared to compact growth. The study team employed a housing-cost model to determine differences in housing prices in various locations. The housing-cost model factored in the land component of housing price, allowing this cost component to rise or fall according to the amount of land included in the larger lot-size locations of limited growth areas, or the reduced lot-size locations of more active growth areas. Additionally, the model factored in differences in housing prices across these locations. Reflecting the above, it was found that *land preservation efforts serve to raise regional housing costs if they are not counteracted by increases in densities* in areas that accommodate new development near already developed areas.

The results of the Burchell study follow.

1. Relative to sprawl development, where growth was occurring in New Jersey's outlying locations and often encroaching on environmentally sensitive areas, compact development would contain growth in such areas or would allow it only at lower densities (i.e., to be environmentally compatible).
2. Because of the land development constraints under compact growth, the price per acre of land would decrease in such locations.

3. Although the price per acre would decline, a housing unit would occupy significantly more land in rural and environmentally sensitive areas under compact growth (because development would be allowed only at much lower densities), causing an overall increase in housing prices.
4. A contrary effect would occur, however, in other portions of the state under the compact growth alternative. For instance, a larger share of development would take place near existing centers, in contrast to the deconcentration occurring under current development. Consequently, housing prices would decrease in these centers and in redeveloping/infill areas as a result of the inherently higher density of the housing mix proposed there (i.e., a higher share of attached single-family and multifamily units).
5. The specific findings of the Burchell study may be summarized as follows: Under current development trends, the median housing price in constant 1990 dollars was $172,657; under compact growth, the price would be $162,162—$10,495 less, representing a savings of slightly more than 6 percent for the latter alternative.

Summary

When the full array of housing construction costs under compact growth compared to current development trends is examined—taking into account both instances of rising and lowered costs, as the New Jersey impact assessment considered—it is found that compact growth serves to moderate rather than increase the cost of housing.

On the other hand, when building permits are limited but there is no provision to offset this constraint with allowance for some housing at slightly higher densities, housing costs will rise under compact growth plans. This occurred in Davis and Petaluma, California, and in Boca Raton, Florida (Fischel 1990).

Land Consumption: Current Development Trends versus Compact Growth

The Rutgers University impact assessment (Burchell et al. 1992a, 1992b) examined overall land consumption under the two development scenarios of current and compact growth and further considered the relative conversion of agricultural acreage and impacts on fragile lands. Agricultural lands included such categories as cropland that is harvested, lands in permanent pasture, and woodlands that can be used for agricultural purposes. Fragile land encompassed floodplains and wetlands, acreage with steep slopes or with critical habitat designation, aquifer recharge areas and critically sensitive watersheds, and stream buffers. The analysis employed a land-consumption model at the local level to examine differences between current and compact growth scenarios. This model allowed future projections of households and jobs to be converted to the demand for residential and nonresidential structures, and ultimately to the demand for residential and nonresidential land. Historical rates of farmland takings were applied to land consumed under the sprawl development future, and goals of farmland retention were applied under the compact growth scenario. A similar

procedure was used for fragile land-consumption comparisons. The model, using different densities, development locations, and housing types for current versus compact growth, calculated the total agricultural and fragile lands consumed under each development alternative and expressed these as well as their differences in acres. The results are described below.

The analysis found that there was more than enough land statewide to accommodate twenty-year development projections (1990-2010) of persons (520,000), households (431,000), and employees (654,000) under both current and compact growth alternatives. As of 1990, there was a total of two million acres available for development in the state of New Jersey. Of these two million acres, development between 1990 and 2010 under current conditions would consume 292,079 acres, whereas compact growth that accommodated the same level of growth (persons, households and jobs) would consume only 117,607 acres—174,472 fewer than under current development (Burchell et al. 1992b). Thus, compact growth's overall land drawdown was 60 percent less than that of current development. The impact assessment further found that compact growth would have the environmental advantage of preserving greater levels of fragile and agricultural lands. Reflecting historical rates of loss, under current conditions 36,482 acres of fragile lands would be consumed for development; by contrast, under compact growth the consumption of these lands would drop to 7,150 acres or by 83 percent. Thus, compact growth in New Jersey could not only accommodate future development but would preserve 30,000 acres of fragile environmental lands. In a similar vein, the study found that under current development 108,000 agricultural acres would be consumed during the period 1990-2010, whereas under compact growth, only 66,000 agricultural acres would be converted. This represented a savings of 42,000 acres, or 40 percent of prime agricultural land. The savings in New Jersey were more pronounced than findings elsewhere due in part to the differences in density of areas designated as centers compared to densities of the prevailing development pattern in New Jersey.

Fiscal Impacts and Current Versus Compact Development

In theory, cost-revenue impacts and observed differences under current trends versus compact growth depend on two factors. The first is the ability to influence the type of development. To the degree that dwelling type can be altered by compact versus current development in subregional settings, the demographics and the resulting public service costs of development will change. A second important factor is the ability to influence the intensity and scale of new neighborhoods. If compact development provides more contained development patterns, infrastructure provision will be less. So too will the annual debt service on capital costs for roads, water/sewer lines, and so on, as well as the annual maintenance costs associated with these facilities. A further important factor is the location where development takes place. If it is located near existing development, excess service capacity may be drawn upon. If development is skipped over, providing new public service infrastructure will almost always be more expensive than extending existing facilities.

Only the second category of influence—the intensity and compactness of new neighborhoods—should be relied heavily upon for areally larger applications of growth management (i.e., the regional level). With regard to the first category, it is difficult to influence housing type (and thus, demographics) for an entire state. At the subregional level, the ability to influence housing choice leads potentially to the export of housing types to other subregional areas. In other words, trying to save public service costs by influencing the demographics of occupied structures may drive those who would have occupied the original structures elsewhere to reside (sending up service costs there). What's more, the demographics of the altered housing type may be the same as the first (maintaining high service costs in the original location).

In one of the only studies since the 1974 *Costs of Sprawl* study to view the effects of different development patterns on public service costs, the Rutgers University study (Burchell et al. 1992a, 1992b) used a cost-revenue model to view the effects of current versus compact development. The Rutgers fiscal impact model estimated the number of people, employees, and students that would be attracted by development under different development scenarios and projected future costs versus revenues. Although population and employment projections did not vary between alternatives at the regional and state levels, at the municipal level there were significant differences. In the scenarios analyzed for compact growth, urban communities with slack service capacity received more growth than rural areas with lesser amounts of public service infrastructure. The reduced infrastructure provision and the potentially reduced annual maintenance on this infrastructure calculated to more positive fiscal impacts for compact growth.

The Rutgers study in New Jersey found that by containing population and jobs in already developed areas and by creating or expanding centers in newly developing areas, the State Plan (compact growth) offered an annual $112 million (or 2 percent) fiscal advantage to municipalities. This advantage reflected the ability under the managed growth scenario to draw on usable excess operating capacity in already developed areas as well as efficiencies of service delivery. For instance, fewer lane-miles of local roads would have to be built under the compact growth alternative, thus saving future municipal public works maintenance and debt service costs. Public school districts would realize a $286 million (or 2 percent) annual financial advantage under the State Plan, again a reflection of drawing on usable excess public school operating capacity and other service and fiscal efficiencies realized from the redirection of population via compact growth. Thus, municipal and school district providers of public services could be ahead fiscally by nearly $400 million annually under compact compared to current development while supplying a similar quality of services.

Under current development, New Jersey's school districts would have to provide 288,000 new pupil spaces to the year 2010 (365,000 gross need less 77,000 usable excess spaces); for compact development, the need was a somewhat lower 278,000 pupil spaces, reflecting some excess space in central locations. Overall, if new space had to

be built to accommodate all new students, costs of new school facilities would be approximately $5.3 billion under current development trends compared to $5.1 billion under compact development. Thus, $200 million (or approximately 3 percent) potentially could be saved due to somewhat more excess capacity in closer-in areas being drawn upon by compact growth compared to what could be drawn upon by current development trends in suburban and rural areas (Burchell et al. 1992b).

Summary of Development Pattern Impacts

This report has reviewed the literature with regard to compact growth versus current development trends for public/private capital costs (infrastructure requirements/costs and housing costs), land consumption, and cost-revenue impacts. The most extensive literature concerns public capital needs/costs.† The empirical investigations with respect to the remaining three subject areas are sparser. The findings may be summarized as follows:

◊ CAPITAL (PUBLIC INFRASTRUCTURE) COSTS
Compact growth relative to current development is:
- 75 percent as expensive with respect to roads
- 95 percent as expensive with respect to schools
- 85 percent as expensive with respect to utilities
- at parity with respect to other infrastructure

◊ CAPITAL (PRIVATE HOUSING) COSTS
Compact growth relative to current development:
- doesn't increase housing costs and, in fact, may afford a small (i.e., less than 6 percent) savings

◊ LAND CONSUMPTION
Compact growth relative to current development consumes:
- 40 percent as much land overall
- 60 percent as much of agricultural acreage and 17 percent the level of fragile lands

◊ FISCAL IMPACTS
Compact growth relative to current development:
- is less costly on an annual basis to both municipality and school district by about 2–3 percent

Applying the Results of Savings to South Carolina Infrastructure Costs

The foregoing results of infrastructure, land, housing cost, and municipal cost revenue savings are corroborated by similar studies undertaken in Lexington, Kentucky, the Delaware Estuary, and Michigan. The results of these more recent studies are more applicable to the State of South Carolina because they have been undertaken in rural and suburbanizing locations. Figure 1 shows the results for the categories of infrastructure shown above.

† Three empirical studies are summarized; for other areas of impact, the New Jersey State Plan (AIPLAN) analysis (Burchell et al. 1992b) is the primary source.

Figure 1

NATURAL AND MAN-MADE INFRASTRUCTURE SAVINGS: COMPACT GROWTH OVER CURRENT DEVELOPMENT

Area of Impact	Lexington, KY and Delaware Estuary	Michigan	South Carolina
Developable Land	20.5-24.2%	15.5% 9,733 acres	15%
Agricultural Land	18-29%	17.4% 7,454 acres	18%
Frail Land	20-27%	20.9% 1,984 acres	22%
Infrastructure Roads (local)	14.8-19.7%	12.4% (190 Lane miles)	12%
Utilities (water/sewer)	6.7-8.2%	13.7% 10,400 hookups	13%
Housing Costs	2.5-8.4%	6.8% $10,930	7%
Cost-Revenue Impacts	6.9%	3.5% $1.85 million (annually)	5%

These savings are applied to the specific areas of infrastructure that they impact and result in an overall infrastructure savings of approximately 6.0 percent. The overall savings amount to $2.7 billion when applied to a total of $42.8 billion.

The remaining infrastructure need that cannot be addressed by technology or land pattern changes is approximately $40 billion.

The savings is 6.0 percent overall because all categories of infrastructure are not impacted by costs of sprawl savings.

SAVINGS FOUND IN THE COSTS OF SPRAWL APPLIED TO INFRASTRUCTURE CATEGORIES OF SOUTH CAROLINA

The savings noted above are applied to infrastructure categories after gross infrastructure costs have already been reduced by savings potentially available from new technologies, alternative infrastructure approaches, and the regional sharing of infrastructure. Thus, the number to which costs of sprawl savings are applied is reduced by 25 percent prior to their application. This obviously reduces the effect of the costs of sprawl savings. Nonetheless, costs of sprawl savings are significant—$2.7

billion. Further, since fiscal impact savings are annual and the savings due to costs of sprawl is about $250 million, the 20-year impact of these annual savings is almost $5 billion. Finally, these particular savings are available primarily to county governments and school districts as opposed to specific agencies of state government. Thus, the savings that accrue—primarily in county roads, county water/sewer lines, and county and school district operating expenses—are retained in taxpayers' pockets rather than reallocated to another area of state government.

THE QUID PRO QUO FOR COSTS OF SPRAWL SAVINGS

The quid pro quo for costs of sprawl savings is an obligation on the part of county and municipal governments to channel growth to locations where public service provision will be most efficient and away from areas where it will be least efficient. The savings discussed in this report are predicated upon retaining one-half of the growth that currently takes place in skipped-over rural areas in areas closer in to already developed areas. In so doing, those areas that had been receiving growth and had to develop significant infrastructure to accommodate growth will receive less growth and will have less of a requirement for infrastructure. On the other hand, areas to which more growth is now being directed must increase their densities by about 20 percent in the process of accommodating this growth. This low-impact "design density" increase allows the remaining growth that goes to sprawl locations to do so at density reductions of 50 percent of former levels. Thus, not only does less growth go to peripheral areas, but the growth that is directed there will be at significantly reduced densities.

THE IMPORTANCE OF GROWTH MANAGEMENT

Sprawl and its costs cannot be brought under control without land management concepts that alter the location of this growth. These include: purchase/transfer of development rights (PDR/TDR); the establishment of center and urban growth boundaries; tax increment financing districts; transportation corridors; mixed-use and planned-unit development districts; and other growth management devices. The above techniques, through zoning or incentive, create the opportunity to control both tempo (timing) and sequence (location) of development. This is essential to orderly and cost-efficient growth.

The difference between growth management and growth control is that growth management recognizes the benefits of growth and attempts to influence its location. Growth management redirects a portion of growth away from peripheral areas and to locations closer in. It also recognizes the concept of rural centers and their need for sustained growth.

A DEMONSTRATION PROGRAM FOR GROWTH MANAGEMENT

Little of the above can be accomplished without a serious look at the growth management techniques listed above and their territorial expression on both the county and state maps of South Carolina. This type of cost-efficient land management could begin on a voluntary basis as part of a demonstration program for counties in a particular

region. State funding could be made available to undertake such a project in a region. Study and technique development and implementation could proceed on a trial basis with regular review and monitoring by state agencies and other local governments. At the end of the trial period, the demonstration counties could decide to accept or reject the management scheme, and a similar decision could be made by other counties and the state. In this type of demonstration, growth management activities could be linked and integrated with capital facilities planning and development. In this way, both growth and the availability of public services would follow a similar course. This would enable the types of infrastructure savings noted earlier in this section.

CONCLUSION

This report has sought to present what the literature has found concerning the costs of two alternative growth patterns (current development versus compact growth) and to view these potential savings within a South Carolina context. Of particular significance is the finding that a group of citizens making decisions about future public policy, by choosing compact growth, could potentially reduce land consumption and road building in their living environment by significant amounts. These are important societal accomplishments by any measure.

Ongoing operating costs for roads and infrastructure might also be reduced if a community's capital commitments were ultimately diminished. Additionally, by preserving land in the process of development, under compact growth, there is less need to acquire land for parks and recreation as it becomes less plentiful and more costly. Finally, by containing development around existing centers, these centers might be maintained as healthier entities, better able to pay their taxes in full. All of this could contribute to lower taxpayer costs in the region.

PART B

STATEWIDE COSTS OF SPRAWL SAVINGS

Figure 2
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
STATE TOTAL

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	16,998	1,235	7	471	3	1,706	10	15,292
Bridges	2,413	377	16	9	0	386	16	2,027
Public Transportation	1,022	-	-	-	-	-	-	1,022
Freight (Rail and Road)	246	-	-	-	-	-	-	246
Ports	1,352	-	-	-	-	-	-	1,352
Aviation (Including Air Freight)	576	-	-	-	-	-	-	576
Other Transportation Facilities	16	2	10	0	2	2	12	14
Total	**22,623**	**1,613**	**7**	**481**	**2**	**2,094**	**9**	**20,529**
COMMERCE								
Economic Development	1,355	2	0	0	0	2	0	1,353
Farmland Retention	58	1	2	0	1	1	2	57
Energy	313	-	-	-	-	-	-	313
Telecommunications	1,084	-	-	-	-	-	-	1,084
Total	**2,810**	**3**	**0**	**1**	**0**	**4**	**0**	**2,806**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	1,004	11	1	21	2	33	3	971
Justice (Courts)	377	3	1	6	2	9	2	368
Public Admin./ Instit./ Hsg.	408	5	1	10	3	15	4	394
Total	**1,789**	**19**	**1**	**38**	**2**	**57**	**3**	**1,732**
EDUCATION								
Public Education	5,028	11	0	101	2	112	2	4,915
Higher Education	2,484	-	-	-	-	-	-	2,484
Total	**7,512**	**11**	**0**	**101**	**1**	**112**	**1**	**7,399**
HEALTH								
Public Health Care	903	-	-	-	-	-	-	903
Water Supply	1,724	5	0	134	8	139	8	1,585
Waste Water Disposal	2,222	47	2	121	5	168	8	2,054
Solid Waste Management	798	-	-	-	-	-	-	798
Total	**5,646**	**52**	**1**	**255**	**5**	**307**	**5**	**5,339**
RECREATION AND CULTURE								
Recreational Facilities	428	-	-	-	-	-	-	428
Arts / Library	342	-	-	-	-	-	-	342
Historic Resources	322	-	-	-	-	-	-	322
Total	**1,092**	**-**	**-**	**-**	**-**	**-**	**-**	**1,092**
ENVIRONMENT								
Storm Water Management	562	16	3	28	5	45	8	518
Shore and River Protection	340	-	-	-	-	-	-	340
Sensitive Land and Water	200	16	8	16	8	32	16	169
Open Space	168	2	1	4	3	6	4	161
Air Pollution	37	-	-	-	-	-	-	37
Total	**1,307**	**34**	**3**	**49**	**4**	**83**	**6**	**1,224**
OVERALL TOTAL	**42,779**	**1,733**	**4**	**924**	**2**	**2,656**	**6**	**40,123**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

PART C

REGIONAL COSTS OF SPRAWL SAVINGS

Figure 2A
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
UPPER SAVANNAH REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	966	74	8	17	2	91	9	875
Bridges	115	16	14	1	1	17	14	98
Public Transportation	49	-	-	-	-	-	-	49
Freight (Rail and Road)	9	-	-	-	-	-	-	9
Ports	-	-		-		-		-
Aviation (Including Air Freight)	10	-	-	-	-	-	-	10
Other Transportation Facilities	0	0	13	0	1	0	14	0
Total	**1,149**	**90**	**8**	**18**	**2**	**107**	**9**	**1,041**
COMMERCE								
Economic Development	122	0	0	0	0	0	0	121
Farmland Retention	4	0	1	0	0	0	1	3
Energy	23	-	-	-	-	-	-	23
Telecommunications	35	-	-	-	-	-	-	35
Total	**183**	**0**	**0**	**0**	**0**	**0**	**0**	**182**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	73	1	1	2	2	3	3	71
Justice (Courts)	23	0	1	0	2	1	2	22
Public Admin./ Instit./ Hsg.	24	0	1	1	3	1	4	23
Total	**120**	**1**	**1**	**3**	**2**	**4**	**3**	**116**
EDUCATION								
Public Education	160	0	0	3	2	3	2	157
Higher Education	31	-	-	-	-	-	-	31
Total	**191**	**0**	**0**	**3**	**2**	**3**	**2**	**188**
HEALTH								
Public Health Care	29	-	-	-	-	-	-	29
Water Supply	63	0	0	4	6	4	6	59
Waste Water Disposal	104	3	3	4	4	7	7	97
Solid Waste Management	43	-	-	-	-	-	-	43
Total	**239**	**3**	**1**	**8**	**3**	**11**	**5**	**228**
RECREATION AND CULTURE								
Recreational Facilities	21	-	-	-	-	-	-	21
Arts / Library	10	-	-	-	-	-	-	10
Historic Resources	20	-	-	-	-	-	-	20
Total	**51**	**-**	**-**	**-**	**-**	**-**	**-**	**51**
ENVIRONMENT								
Storm Water Management	23	1	3	1	4	2	7	22
Shore and River Protection	18	-	-	-	-	-	-	18
Sensitive Land and Water	12	1	7	1	11	2	18	10
Open Space	10	0	2	0	4	1	6	10
Air Pollution	2	-	-	-	-	-	-	2
Total	**65**	**2**	**3**	**3**	**4**	**4**	**7**	**61**
OVERALL TOTAL	**1,997**	**96**	**5**	**34**	**2**	**130**	**7**	**1,867**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2B
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
PEE DEE REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	1,148	84	7	20	2	104	9	1,044
Bridges	180	28	16	0	0	28	16	152
Public Transportation	45	-	-	-	-	-	-	45
Freight (Rail and Road)	15	-	-	-	-	-	-	15
Ports	-	-		-		-		-
Aviation (Including Air Freight)	23	-	-	-	-	-	-	23
Other Transportation Facilities	0	0	11	0	1	0	12	0
Total	**1,412**	**112**	**8**	**20**	**1**	**132**	**9**	**1,280**
COMMERCE								
Economic Development	143	0	0	0	0	0	0	143
Farmland Retention	4	0	1	0	0	0	1	4
Energy	19	-	-	-	-	-	-	19
Telecommunications	78	-	-	-	-	-	-	78
Total	**245**	**0**	**0**	**0**	**0**	**0**	**0**	**244**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	95	1	1	1	1	3	3	92
Justice (Courts)	28	0	0	0	1	0	1	28
Public Admin./ Instit./ Hsg.	36	0	1	1	2	1	3	35
Total	**159**	**2**	**1**	**2**	**1**	**4**	**3**	**155**
EDUCATION								
Public Education	215	0	0	3	1	4	2	212
Higher Education	82	-	-	-	-	-	-	82
Total	**297**	**0**	**0**	**3**	**1**	**4**	**1**	**294**
HEALTH								
Public Health Care	38	-	-	-	-	-	-	38
Water Supply	89	0	0	5	6	6	6	83
Waste Water Disposal	173	3	2	6	3	9	5	164
Solid Waste Management	146	-	-	-	-	-	-	146
Total	**445**	**3**	**1**	**11**	**2**	**14**	**3**	**431**
RECREATION AND CULTURE								
Recreational Facilities	29	-	-	-	-	-	-	29
Arts / Library	16	-	-	-	-	-	-	16
Historic Resources	17	-	-	-	-	-	-	17
Total	**62**	**-**	**-**	**-**	**-**	**-**	**-**	**62**
ENVIRONMENT								
Storm Water Management	28	1	3	1	4	2	7	26
Shore and River Protection	6	-	-	-	-	-	-	6
Sensitive Land and Water	6	0	4	0	5	1	9	6
Open Space	11	0	1	0	2	0	2	11
Air Pollution	2	-	-	-	-	-	-	2
Total	**54**	**1**	**2**	**2**	**3**	**3**	**5**	**51**
OVERALL TOTAL	**2,674**	**119**	**4**	**38**	**1**	**157**	**6**	**2,517**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2C
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
CATAWBA REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	1,181	75	6	31	3	106	9	1,075
Bridges	126	17	14	0	0	18	14	108
Public Transportation	71	-	-	-	-	-	-	71
Freight (Rail and Road)	12	-	-	-	-	-	-	12
Ports	-	-		-		-		-
Aviation (Including Air Freight)	9	-	-	-	-	-	-	9
Other Transportation Facilities	1	0	15	0	1	0	16	1
Total	**1,399**	**93**	**7**	**31**	**2**	**124**	**9**	**1,276**
COMMERCE								
Economic Development	109	0	0	0	0	0	0	109
Farmland Retention	4	0	2	0	1	0	3	4
Energy	18	-	-	-	-	-	-	18
Telecommunications	35	-	-	-	-	-	-	35
Total	**167**	**0**	**0**	**0**	**0**	**0**	**0**	**167**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	112	1	1	3	2	4	4	108
Justice (Courts)	26	0	1	1	2	1	3	25
Public Admin./ Instit./ Hsg.	31	0	2	1	3	1	5	29
Total	**169**	**2**	**1**	**4**	**3**	**6**	**4**	**162**
EDUCATION								
Public Education	287	1	0	10	3	10	4	276
Higher Education	282	-	-	-	-	-	-	282
Total	**568**	**1**	**0**	**10**	**2**	**10**	**2**	**558**
HEALTH								
Public Health Care	53	-	-	-	-	-	-	53
Water Supply	147	1	1	11	8	13	9	134
Waste Water Disposal	206	1	1	10	5	12	6	194
Solid Waste Management	47	-	-	-	-	-	-	47
Total	**453**	**3**	**1**	**22**	**5**	**24**	**5**	**429**
RECREATION AND CULTURE								
Recreational Facilities	28	-	-	-	-	-	-	28
Arts / Library	19	-	-	-	-	-	-	19
Historic Resources	15	-	-	-	-	-	-	15
Total	**62**	**-**	**-**	**-**	**-**	**-**	**-**	**62**
ENVIRONMENT								
Storm Water Management	40	1	3	2	6	3	8	36
Shore and River Protection	10	-	-	-	-	-	-	10
Sensitive Land and Water	10	1	7	1	6	1	14	8
Open Space	10	0	1	0	2	0	3	10
Air Pollution	2	-	-	-	-	-	-	2
Total	**71**	**2**	**3**	**3**	**4**	**5**	**7**	**66**
OVERALL TOTAL	**2,889**	**100**	**3**	**70**	**2**	**170**	**6**	**2,719**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2D
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
WACCAMAW REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	1,705	156	9	52	3	208	12	1,497
Bridges	125	20	16	0	0	21	17	104
Public Transportation	113	-	-	-	-	-	-	113
Freight (Rail and Road)	16	-	-	-	-	-	-	16
Ports	8	-	-	-	-	-	-	8
Aviation (Including Air Freight)	48	-	-	-	-	-	-	48
Other Transportation Facilities	1	0	16	0	1	0	16	1
Total	**2,015**	**177**	**9**	**52**	**3**	**229**	**11**	**1,786**
COMMERCE								
Economic Development	117	0	0	0	0	0	0	117
Farmland Retention	4	0	3	0	1	0	4	4
Energy	19	-	-	-	-	-	-	19
Telecommunications	51	-	-	-	-	-	-	51
Total	**191**	**0**	**0**	**0**	**0**	**0**	**0**	**191**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	84	1	1	2	3	3	4	80
Justice (Courts)	22	0	1	0	2	1	2	22
Public Admin./ Instit./ Hsg.	33	0	1	1	4	2	5	31
Total	**139**	**2**	**1**	**4**	**3**	**5**	**4**	**134**
EDUCATION								
Public Education	592	2	0	12	2	14	2	578
Higher Education	71	-	-	-	-	-	-	71
Total	**663**	**2**	**0**	**12**	**2**	**14**	**2**	**649**
HEALTH								
Public Health Care	54	-	-	-	-	-	-	54
Water Supply	150	1	0	14	9	14	9	136
Waste Water Disposal	185	4	2	12	7	16	9	168
Solid Waste Management	39	-	-	-	-	-	-	39
Total	**428**	**4**	**1**	**26**	**6**	**31**	**7**	**397**
RECREATION AND CULTURE								
Recreational Facilities	35	-	-	-	-	-	-	35
Arts / Library	22	-	-	-	-	-	-	22
Historic Resources	26	-	-	-	-	-	-	26
Total	**82**	**-**	**-**	**-**	**-**	**-**	**-**	**82**
ENVIRONMENT								
Storm Water Management	51	2	4	3	6	5	9	47
Shore and River Protection	86	-	-	-	-	-	-	86
Sensitive Land and Water	27	2	9	3	11	5	19	22
Open Space	13	0	2	1	4	1	6	12
Air Pollution	3	-	-	-	-	-	-	3
Total	**180**	**4**	**2**	**6**	**4**	**11**	**6**	**169**
OVERALL TOTAL	**3,698**	**189**	**5**	**101**	**3**	**290**	**8**	**3,408**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2E
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
LOWCOUNTRY REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	891	63	7	27	3	91	10	801
Bridges	145	22	15	-	-	22	15	123
Public Transportation	50	-	-	-	-	-	-	50
Freight (Rail and Road)	9	-	-	-	-	-	-	9
Ports	125	-	-	-	-	-	-	125
Aviation (Including Air Freight)	271	-	-	-	-	-	-	271
Other Transportation Facilities	1	0	15	0	1	0	16	0
Total	**1,491**	**86**	**6**	**27**	**2**	**113**	**8**	**1,379**
COMMERCE								
Economic Development	100	0	0	0	0	0	0	100
Farmland Retention	5	0	4	0	2	0	6	5
Energy	11	-	-	-	-	-	-	11
Telecommunications	33	-	-	-	-	-	-	33
Total	**150**	**0**	**0**	**0**	**0**	**0**	**0**	**149**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	48	1	1	1	2	2	3	47
Justice (Courts)	20	0	1	0	3	1	3	19
Public Admin./ Instit./ Hsg.	24	0	1	1	4	1	5	23
Total	**92**	**1**	**1**	**2**	**3**	**3**	**4**	**89**
EDUCATION								
Public Education	331	1	0	7	2	8	2	323
Higher Education	63	-	-	-	-	-	-	63
Total	**394**	**1**	**0**	**7**	**2**	**8**	**2**	**386**
HEALTH								
Public Health Care	56	-	-	-	-	-	-	56
Water Supply	100	0	0	9	9	9	10	90
Waste Water Disposal	194	9	5	8	4	17	9	177
Solid Waste Management	35	-	-	-	-	-	-	35
Total	**384**	**10**	**3**	**17**	**4**	**26**	**7**	**357**
RECREATION AND CULTURE								
Recreational Facilities	61	-	-	-	-	-	-	61
Arts / Library	10	-	-	-	-	-	-	10
Historic Resources	13	-	-	-	-	-	-	13
Total	**84**	**-**	**-**	**-**	**-**	**-**	**-**	**84**
ENVIRONMENT								
Storm Water Management	31	1	3	2	6	3	9	28
Shore and River Protection	95	-	-	-	-	-	-	95
Sensitive Land and Water	42	4	9	5	12	9	20	33
Open Space	7	0	1	0	3	0	4	6
Air Pollution	2	-	-	-	-	-	-	2
Total	**176**	**5**	**3**	**7**	**4**	**12**	**7**	**165**
OVERALL TOTAL	**2,771**	**103**	**4**	**60**	**2**	**163**	**6**	**2,608**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2F
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
LOWER SAVANNAH REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	1,219	67	6	27	2	94	8	1,125
Bridges	115	17	15	0	0	17	15	98
Public Transportation	46	-	-	-	-	-	-	46
Freight (Rail and Road)	19	-	-	-	-	-	-	19
Ports	-	-		-		-		-
Aviation (Including Air Freight)	10	-	-	-	-	-	-	10
Other Transportation Facilities	1	0	16	0	1	0	17	1
Total	**1,410**	**84**	**6**	**27**	**2**	**111**	**8**	**1,299**
COMMERCE								
Economic Development	53	0	0	0	0	0	0	53
Farmland Retention	4	0	2	0	1	0	2	4
Energy	42	-	-	-	-	-	-	42
Telecommunications	48	-	-	-	-	-	-	48
Total	**147**	**0**	**0**	**0**	**0**	**0**	**0**	**146**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	117	2	1	3	3	5	4	112
Justice (Courts)	37	0	1	1	2	1	3	36
Public Admin./ Instit./ Hsg.	25	0	1	1	2	1	3	25
Total	**179**	**2**	**1**	**5**	**3**	**7**	**4**	**172**
EDUCATION								
Public Education	367	1	0	7	2	8	2	359
Higher Education	251	-	-	-	-	-	-	251
Total	**619**	**1**	**0**	**7**	**1**	**8**	**1**	**611**
HEALTH								
Public Health Care	65	-	-	-	-	-	-	65
Water Supply	121	0	0	9	7	9	7	112
Waste Water Disposal	151	2	1	8	5	10	7	141
Solid Waste Management	57	-	-	-	-	-	-	57
Total	**394**	**2**	**1**	**17**	**4**	**19**	**5**	**375**
RECREATION AND CULTURE								
Recreational Facilities	39	-	-	-	-	-	-	39
Arts / Library	17	-	-	-	-	-	-	17
Historic Resources	20	-	-	-	-	-	-	20
Total	**76**	**-**	**-**	**-**	**-**	**-**	**-**	**76**
ENVIRONMENT								
Storm Water Management	46	1	3	2	4	3	7	43
Shore and River Protection	9	-	-	-	-	-	-	9
Sensitive Land and Water	7	0	5	0	5	1	9	6
Open Space	10	0	1	0	2	0	3	10
Air Pollution	4	-	-	-	-	-	-	4
Total	**76**	**2**	**2**	**2**	**3**	**4**	**5**	**72**
OVERALL TOTAL	**2,901**	**91**	**3**	**58**	**2**	**149**	**5**	**2,752**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2G
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
CENTRAL MIDLANDS REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	2,395	170	7	70	3	240	10	2,154
Bridges	128	16	13	1	1	17	13	111
Public Transportation	182	-	-	-	-	-	-	182
Freight (Rail and Road)	49	-	-	-	-	-	-	49
Ports	-	-		-		-		-
Aviation (Including Air Freight)	42	-	-	-	-	-	-	42
Other Transportation Facilities	3	0	7	0	2	0	10	2
Total	**2,798**	**186**	7	**71**	3	**257**	9	**2,541**
COMMERCE								
Economic Development	106	0	0	0	0	0	0	106
Farmland Retention	8	0	2	0	1	0	2	8
Energy	51	-	-	-	-	-	-	51
Telecommunications	232	-	-	-	-	-	-	232
Total	**397**	**0**	0	**0**	0	**0**	0	**397**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	121	1	1	3	2	4	3	116
Justice (Courts)	66	1	1	1	2	2	3	65
Public Admin./ Instit./ Hsg.	85	2	2	2	3	4	5	81
Total	**272**	**4**	1	**6**	2	**10**	4	**262**
EDUCATION								
Public Education	786	2	0	16	2	18	2	768
Higher Education	923	-	-	-	-	-	-	923
Total	**1,709**	**2**	0	**16**	1	**18**	1	**1,691**
HEALTH								
Public Health Care	143	-	-	-	-	-	-	143
Water Supply	313	0	0	22	7	22	7	290
Waste Water Disposal	320	2	1	20	6	22	7	298
Solid Waste Management	104	-	-	-	-	-	-	104
Total	**880**	**2**	0	**42**	5	**45**	5	**836**
RECREATION AND CULTURE								
Recreational Facilities	59	-	-	-	-	-	-	59
Arts / Library	84	-	-	-	-	-	-	84
Historic Resources	44	-	-	-	-	-	-	44
Total	**187**	-	-	-	-	-	-	**187**
ENVIRONMENT								
Storm Water Management	96	3	3	5	5	8	8	88
Shore and River Protection	11	-	-	-	-	-	-	11
Sensitive Land and Water	20	2	8	1	4	2	12	18
Open Space	25	0	1	0	1	1	2	24
Air Pollution	5	-	-	-	-	-	-	5
Total	**158**	**5**	3	**6**	4	**11**	7	**147**
OVERALL TOTAL	**6,401**	**200**	3	**141**	2	**341**	5	**6,060**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2H
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
SANTEE LYNCHES REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	744	53	7	17	2	69	9	675
Bridges	86	14	16	0	0	14	16	72
Public Transportation	35	-	-	-	-	-	-	35
Freight (Rail and Road)	10	-	-	-	-	-	-	10
Ports	-	-		-		-		-
Aviation (Including Air Freight)	7	-	-	-	-	-	-	7
Other Transportation Facilities	0	0	13	0	1	0	14	0
Total	883	67	8	17	2	83	9	799
COMMERCE								
Economic Development	59	0	0	0	0	0	0	59
Farmland Retention	3	0	1	0	0	0	2	3
Energy	16	-	-	-	-	-	-	16
Telecommunications	24	-	-	-	-	-	-	24
Total	102	0	0	0	0	0	0	102
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	60	1	1	1	2	2	4	58
Justice (Courts)	24	0	1	1	3	1	4	23
Public Admin./ Instit./ Hsg.	11	0	1	0	2	0	2	11
Total	95	1	1	2	2	3	3	92
EDUCATION								
Public Education	201	0	0	4	2	4	2	197
Higher Education	47	-	-	-	-	-	-	47
Total	248	0	0	4	2	4	2	244
HEALTH								
Public Health Care	29	-	-	-	-	-	-	29
Water Supply	80	0	0	5	7	5	7	74
Waste Water Disposal	113	3	3	5	4	8	7	105
Solid Waste Management	39	-	-	-	-	-	-	39
Total	260	3	1	10	4	13	5	247
RECREATION AND CULTURE								
Recreational Facilities	14	-	-	-	-	-	-	14
Arts / Library	20	-	-	-	-	-	-	20
Historic Resources	13	-	-	-	-	-	-	13
Total	47	-	-	-	-	-	-	47
ENVIRONMENT								
Storm Water Management	23	1	3	1	5	2	8	21
Shore and River Protection	8	-	-	-	-	-	-	8
Sensitive Land and Water	8	0	4	1	8	1	13	7
Open Space	8	0	1	0	2	0	3	8
Air Pollution	2	-	-	-	-	-	-	2
Total	49	1	2	2	4	3	6	46
OVERALL TOTAL	1,684	72	4	35	2	107	6	1,577

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2I
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
APPALACHIAN REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	3,710	204	5	124	3	327	9	3,383
Bridges	348	43	12	5	1	48	14	300
Public Transportation	255	-	-	-	-	-	-	255
Freight (Rail and Road)	65	-	-	-	-	-	-	65
Ports	-	-		-		-		-
Aviation (Including Air Freight)	123	-	-	-	-	-	-	123
Other Transportation Facilities	4	0	6	0	2	0	8	4
Total	**4,505**	**247**	**5**	**129**	**3**	**376**	**8**	**4,130**
COMMERCE								
Economic Development	403	1	0	0	0	1	0	402
Farmland Retention	14	0	2	0	1	0	2	14
Energy	68	-	-	-	-	-	-	68
Telecommunications	284	-	-	-	-	-	-	284
Total	**769**	**1**	**0**	**0**	**0**	**1**	**0**	**768**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	179	2	1	3	2	5	3	174
Justice (Courts)	44	0	0	0	1	0	1	44
Public Admin./ Instit./ Hsg.	42	0	1	1	2	1	3	41
Total	**266**	**2**	**1**	**5**	**2**	**7**	**2**	**259**
EDUCATION								
Public Education	1,371	2	0	26	2	28	2	1,343
Higher Education	419	-	-	-	-	-	-	419
Total	**1,790**	**2**	**0**	**26**	**1**	**28**	**2**	**1,762**
HEALTH								
Public Health Care	198	-	-	-	-	-	-	198
Water Supply	413	1	0	33	8	34	8	379
Waste Water Disposal	470	11	2	28	6	39	8	432
Solid Waste Management	193	-	-	-	-	-	-	193
Total	**1,275**	**12**	**1**	**61**	**5**	**73**	**6**	**1,202**
RECREATION AND CULTURE								
Recreational Facilities	46	-	-	-	-	-	-	46
Arts / Library	82	-	-	-	-	-	-	82
Historic Resources	72	-	-	-	-	-	-	72
Total	**200**	**-**	**-**	**-**	**-**	**-**	**-**	**200**
ENVIRONMENT								
Storm Water Management	139	4	3	7	5	11	8	128
Shore and River Protection	16	-	-	-	-	-	-	16
Sensitive Land and Water	42	3	8	3	7	6	15	36
Open Space	48	1	1	2	3	2	5	45
Air Pollution	10	-	-	-	-	-	-	10
Total	**255**	**8**	**3**	**11**	**4**	**19**	**7**	**236**
OVERALL TOTAL	**9,059**	**271**	**3**	**232**	**3**	**503**	**6**	**8,556**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

Figure 2J
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
BERKELEY-CHARLESTON-DORCHESTER REGION

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	3,039	295	10	84	3	379	12	2,661
Bridges	1,046	185	18	0	0	186	18	861
Public Transportation	176	-	-	-	-	-	-	176
Freight (Rail and Road)	43	-	-	-	-	-	-	43
Ports	1,219	-	-	-	-	-	-	1,219
Aviation (Including Air Freight)	32	-	-	-	-	-	-	32
Other Transportation Facilities	5	1	10	0	2	1	12	4
Total	**5,561**	**481**	**9**	**84**	**2**	**565**	**10**	**4,996**
COMMERCE								
Economic Development	143	0	0	0	0	0	0	143
Farmland Retention	8	0	2	0	1	0	2	7
Energy	47	-	-	-	-	-	-	47
Telecommunications	263	-	-	-	-	-	-	263
Total	**460**	**0**	**0**	**0**	**0**	**0**	**0**	**460**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	115	1	1	1	1	2	2	113
Justice (Courts)	86	1	1	1	1	2	2	84
Public Admin./ Instit./ Hsg.	98	1	1	2	2	3	3	95
Total	**298**	**2**	**1**	**5**	**2**	**7**	**2**	**292**
EDUCATION								
Public Education	718	2	0	14	2	15	2	702
Higher Education	315	-	-	-	-	-	-	315
Total	**1,032**	**2**	**0**	**14**	**1**	**15**	**1**	**1,017**
HEALTH								
Public Health Care	239	-	-	-	-	-	-	239
Water Supply	249	1	0	22	9	23	9	227
Waste Water Disposal	306	11	4	17	6	28	9	278
Solid Waste Management	95	-	-	-	-	-	-	95
Total	**889**	**12**	**1**	**39**	**4**	**51**	**6**	**838**
RECREATION AND CULTURE								
Recreational Facilities	97	-	-	-	-	-	-	97
Arts / Library	63	-	-	-	-	-	-	63
Historic Resources	82	-	-	-	-	-	-	82
Total	**242**	**-**	**-**	**-**	**-**	**-**	**-**	**242**
ENVIRONMENT								
Storm Water Management	85	2	2	5	6	7	8	78
Shore and River Protection	81	-	-	-	-	-	-	81
Sensitive Land and Water	26	2	8	2	6	4	14	23
Open Space	25	0	1	1	2	1	3	25
Air Pollution	6	-	-	-	-	-	-	6
Total	**223**	**4**	**2**	**7**	**3**	**11**	**5**	**212**
OVERALL TOTAL	**8,706**	**502**	**6**	**148**	**2**	**649**	**7**	**8,056**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

SECTION IV

REVENUE/FINANCING ALTERNATIVES AND PROJECTIONS FOR INFRASTRUCTURE DEVELOPMENT

PART A— REVENUE/FINANCING ALTERNATIVES

It is impossible to support infrastructure growth without revenues. The section which follows presents both a menu of county/local revenues to begin to address infrastructure needs and projections of revenues at the state and local levels to determine how much revenues are needed.

Part A of this section presents state and local revenue-raising mechanisms both in South Carolina and elsewhere. This portion of the section begins with a discussion of the issues surrounding infrastructure revenue-raising and the two basic types of approaches to raising these revenues. These are "pay as you go" from local revenues or debt financing of a variety of types. Within these, two basic revenues are presented that: (1) currently exist in the state, and those that have (2) more or (3) less likelihood of being authorized by the state for local use. The latter two categories reflect a combination of both the "close-to-the-vest" nature of the state in authorizing local revenues and the risk associated with, or political acceptability of, implementing certain types of revenues.

Part B of this section provides specific existing and new revenues to meet infrastructure needs. Projections are examples of what has been done elsewhere as opposed to specific recommendations or a particular course of action for the State of South Carolina. Projections are for a full, as opposed to partial, finding of infrastructure need.

THE CHALLENGE OF INFRASTRUCTURE FINANCE

Overview

The current condition of infrastructure is defined by the availability of revenues to fund construction and replacement of needed facilities. In the past a substantial amount of infrastructure was financed with federal and state grants-in-aid in the form of highway funds, sewer and water construction grants, general revenue sharing, and dedicated funding, such as community block grant funds. For a variety of reasons, these funds have been declining over the last fifteen years and, increasingly, the cost of infrastructure has become a local financing obligation. Although there will continue to be federal and state funding for infrastructure, most experts agree that such funds are far less than the amounts needed to provide new and replacement facilities necessary to meet county or municipal needs.

The infrastructure finance problem is compounded by the fact that many of the original capital facilities financed by federal and state grants-in-aid are nearing the end of their useful lives and are in need of renovation or replacement. Thus, not only do local governments need to fund existing facilities' deficiencies and facilities' needs for new growth and development, but they must also fund replacement costs—all at the same time, and in an environment of increasing revenue constraints. The need numbers are usually big, and the scale and array of revenues from which to draw are usually small.

Meeting the challenge of infrastructure finance is complicated by a number of factors. One of the most problematic of

these factors is the long-standing public perception that infrastructure is free and that adequate public facilities are a right. These perceptions took hold because the link between facilities and funding was so distant from local governments that it "appeared" that others—usually the federal government—paid for required facilities. In fact, for many years those sources of funding were, by and large, available at request. The reality, however, is that as state and federal funding has declined, local governments have become increasingly challenged to meet infrastructure needs. During the 1980s many communities in the United States attempted to meet anticipated infrastructure financing shortfalls by imposing development exactions or fees on new growth and development. Development exactions were popular because they were responsive to anti-growth/anti-developer sentiments and were politically expedient. However, as the cost of facilities and housing continues to escalate, these communities are realizing that there is a limit on the ability of the general population to withstand exactions. Currently, in the city of Econdido, California, the exaction amount collected per dwelling unit exceeds $25,000—and the city is looking for more!

Another factor complicating infrastructure finance is the fact that the cost of facilities continues to escalate, at least in part because of the predominant sprawling pattern of development. The classic American infrastructure model is that an area is developed with two-lane roads. Later, as farms on the periphery are developed, traffic congestion on the two-lane road becomes intolerable, and the road must be improved. The first step is to improve the intersections to relieve pressure points until the road is widened. Then, when the pressure for improvement overcomes the inertia of inaction, the intersection improvements are undertaken in a road-widening project that is usually very expensive because of much higher right-of-way costs in developed areas.

Further, infrastructure is often held hostage to the growth management debate as "no growth" or "slow growth" interests argue that infrastructure begets or accelerates growth. While it is undoubtedly true that infrastructure can stimulate the location and magnitude of growth, infrastructure is a relatively crude tool in terms of limiting growth. Indeed, experience around the country demonstrates that infrastructure decisions based on limiting growth have little impact on the rate or intensity of growth and often result in precipitous declines in levels of service and quality of life. On the other hand, the provision of infrastructure can be a powerful tool in terms of "guiding" development to locations where growth is best served.

Infrastructure finance is also impacted by guilt-by-association—a victim of anti-tax, anti-government sentiments. Although there are inefficiencies in public infrastructure projects, infrastructure is an area in which government has proven itself most cost-effective. Nevertheless, additional funding for infrastructure means more taxes (or whatever label is attached), and even modest efforts to raise additional funds for capital facilities are frequently "tarred" by anti-tax groups.

Finally, the relationship between land use and infrastructure has been too-long ignored. Every decision a local government makes in terms of land use has infrastructure implications. Nevertheless, most decisions are made in a vacuum with little or no understanding of cumulative effects and the necessary and incipient infrastructure commitments that attend land use decisions. This phenomenon is complicated by the tendency of local government to finance future needs on the basis of new revenues derived from growth. When the community is rapidly growing, income generally exceeds

demand (in part because the service needs of new growth and development take place in locations where adequate capacity is available for initial phases). However, as the community matures, revenue accounts begin to balance out, and inevitably the slowdown in the growth of revenues and the aging of infrastructure catch up with the community.

Education

Other states have found that there is a lack of general understanding regarding the relationship between the availability of infrastructure and a community's quality of life, and practically *no* understanding of the cost of infrastructure and the sources of revenue on which infrastructure depends. States have embarked on programs of educating the public and its appointed, employed, and elected officials about the nature of infrastructure and the cost of maintaining and improving it.

Unfortunately, infrastructure is not a particularly exciting subject to the average citizen. Except for those occasions when the sewer or street backs up or when water pressure drops, infrastructure is one of those unexciting topics to which someone else should pay attention.

The unfortunate fact is that the entire spectrum of players in the land use "game" need to be educated about the relationship of infrastructure and quality of life and the realities of infrastructure finance.

First and foremost, other states have found that the general public must be educated if it is expected to support significant infrastructure initiatives. The history of infrastructure finance initiatives around the country is that they do not succeed unless the public understands the nature of the facilities' supply-and-demand relationship. It is easy to blame growth for traffic congestion; however, as discussed above, traffic congestion is the result of a whole host of forces, including increased travel by existing residents. The difficulty is that the general public has little interest in infrastructure matters except when fees or taxes are increased or when the level of service declines to a level that is unacceptable. At that point, the public is in no mood to be educated.

What has been discovered is that it takes a deliberate program of educational building blocks. These begin with simple concepts—for example, waste stream separation as a way of improving the cost effectiveness of solid waste disposal, then moving on to the more complex interrelationships that control traffic congestion. Many aspects of traffic movement are counter-intuitive and can be "brought home" only in the abstract. For example, the general public assumes that all additional development will result in more traffic. In reality, a new service use that serves an existing residential population from a more convenient location actually reduces traffic congestion. It takes time and deliberation to debunk the myths of infrastructure, and it requires that school-age children, their parents, and *all* segments of the community be educated in the basic concepts that underlie the infrastructure equation. To the extent that local media—print or television—can be induced to address the infrastructure issue, a newspaper series on infrastructure and quality of life has proven to be very effective, as is a local documentary that compares qualities of life in communities with effective infrastructure planning and finance programs versus those that lack such programs.

The education of the general public is also the first step in the education of its elected officials. Experience shows that it takes more than an enlightened public to achieve infrastructure finance objectives. Elected and appointed officials also need to be educated so that they can winnow through the

"heat" of infrastructure and land use debates and focus on the difficult choices that confront them. Brochures, pamphlets, and guides to infrastructure needs and finance are all useful tools that can be used to educate elected officials about the direct and indirect effects of public policy decision making. Symposia are another effective means of educating elected and appointed officials. Elected and appointed officials find comfort in the experience of others with similar obligations and responsibilities, and symposia are a meaningful opportunity for that kind of exchange. Moreover, symposia present a non-adversarial venue for elected and appointed officials to interact with their staff and constituents outside of the context of a particular issue or conflict.

Finally, the experience of other states shows it is important that local government staff have access to meaningful information about the infrastructure/quality of life paradigm. Professional staff have little time and even less capacity to collect information about other programs and experience regarding infrastructure finance. Ongoing duties make it difficult to focus on more global issues like new initiatives and programs. One way of assisting staff in this regard is to include them in the educational program—both as beneficiaries and as participants. One of the most effective educational experiences is actual involvement in teaching others. Involving professional staff in public presentations as part of a speakers bureau or as symposia attendees is an ideal opportunity for ensuring that all participants in the process are educated.

LONG-RANGE INFRASTRUCTURE FINANCING: A BUSINESS PLAN

In other states it has been found that the importance of both short- and long-term infrastructure planning and financing on the overall economic health and quality of life of the state cannot be over-emphasized. It is essential to both the fiscal integrity of the state and the character and quality of future development that a comprehensive effort be undertaken to identify future capital needs and to plan for these needs.

Infrastructure planning involves the identification of needed improvements along with a short- and long-term plan for financing those improvements. In other states it has been found that infrastructure planning often results in the adoption of a business plan that provides a framework for decision making. This plan addresses the spectrum of land use issues, including how and where growth will occur and who will pay for the infrastructure necessary to serve new development. The business plan balances the demands created by entering developments against the impacts, demands, and deficiencies resulting from existing development.

Taken separately, programming and financing infrastructure improvements are important but somewhat academic exercises. Communities can plan for capital facilities yet not be able to fund their plans, at which point the plans become unrealized. Viewed together, however, the two separate exercises assume new meaning, as the key is the interrelationship of long-range infrastructure planning and long-range infrastructure financing. By considering these two components as part of one effort, the built environment stands a much greater chance of being managed rather than responded to in ad hoc fashion.

Planning for Infrastructure

The array of infrastructure is the skeleton from which the built environment emerges. It is important that the community know what this framework looks like currently and how it is to develop. In an era of government fiscal responsibility, it is up to the communities to operate in an efficient

manner, much like a CEO runs a business. A corporation surely has a capital component included in its business plan. Current equipment needs are well documented, as are future needs for expansion. The business plan contains requirements for replacement equipment as well as for new equipment that would allow for corporate expansion. Financing provisions for replacement and acquisition of new equipment are not left to chance; a well-run corporation has a business plan in place for careful allocation of its capital. A business plan in the public context, like a business plan in the corporate context, is a process for informed and cost-effective decision making.

Other states have found that this kind of careful current assessment of infrastructure and projections of development allow the state to respond in terms of financial resources and directions for growth. By segmenting infrastructure needs into three categories—backlog, rehabilitation, and new growth—priorities begin to take shape. Admittedly, for the latter, the more distant the forecast, the less reliable it is likely to be. Nevertheless, for planning purposes, such projections provide a reference point for various development and funding scenarios. The critical point is that if annual decisions are made without a business plan, money inevitably will be diverted to the issue or crisis of the moment. A sound business plan and corresponding budgeting avoid these crises.

The advantages of a public-sector business plan include the following points:

- First, it creates a more predictable environment for public and private investment and avoids the creation of unrealistic expectations about the timing of development and level of service for needed facilities. If the private sector understands when facilities will be available to serve a particular area, the risk inherent in private-sector investment decisions in those areas and disappointments can be reduced if not avoided.

- Second, an infrastructure business plan and financing program ensure discipline in public-sector decisions. Each year, elected officials are challenged to allocate scarce financial revenues to competing interests. In the absence of a business plan, there is a natural tendency to make budget decisions on the basis of the political pressure of the moment, with the result that less pressing but equally important improvements are unmet.

- Third, infrastructure is provided to existing and planned future development in a manner that makes sense not only from a growth perspective but from a fiscal perspective as well. Too often, counties and municipalities have done the exact opposite: allowing additional development to occur and building needed public facilities at a time when they are much more expensive.

Unlike business planning, local government generally does not have to engage in competition with other local governments. Therefore, it has the advantage of being able to share and cooperate with neighboring jurisdictions. Infrastructure planning is often approached on a regional basis. Roadways do not stop at county boundaries, nor do sewer lines. With regional coordination as part of a multi-level business plan, more efficiency in terms of economies of scale can be achieved.

Three basic components are often found in an infrastructure business plan: 1. a plan for infrastructure development or rehabilitation and a time frame for its implementation; 2. the ability to respond in the context of evolving circumstances; and 3. a monitoring program of ongoing activities and

adapting the business to observed conditions.

Taken one at a time, these three components become part of the business plan.

First, identification of infrastructure needs is broken down by category: public works (sewer, water, roadways, bridges), utilities, parks and recreation, public transit, airport, schools, and libraries, for example. What the region currently has in terms of infrastructure and where it is going in terms of growth are the entries to this equation. Think of this as a spreadsheet, with infrastructure needs listed in rows along the left side, and columns along the top describing cost, financing plan, implementation schedule, and where each project fits relative to the other infrastructure projects.

Second, the business plan is a dynamic document. The state and its inclusive regions must be able to respond to unforeseen changes. Plans should be used as guides, not contracts. For example, if a sewer main were to break and require replacement, even though it was not scheduled for replacement until five years later, the infrastructure business plan must be flexible enough to adjust. Funding must be diverted from a scheduled improvement to respond to this urgent need.

Third, the effort includes annual reviews that analyze the demand placed on existing services and the capacity of these services to meet need. These reviews consider development actually approved versus projected development and adjust the projection for future infrastructure needs accordingly.

Financing Infrastructure

The experience of other states has shown that infrastructure planning can maximize savings locally and within the region. With local budgets stretched thin, this savings is tantamount to garnering additional revenues without a concomitant tax increase. By planning ahead, local governments will save real dollars. For example, a two-lane road constructed this year, followed by construction of turning lanes on that same road three years hence, costs the community additional money. Even accounting for the time value of money in paying for the construction of those turning lanes three years ahead of time, the local government will experience a savings at the end of those three years if it installs the two-lane road with turning lanes at the same time.

- First, debt financing, which is done through bond issuance, allows a public jurisdiction to spend currently and spread out the repayment for the cost of an improvement over successive generations of service users or beneficiaries. This financing technique reduces the demand on the current cash flow of government and allocates the cost to those who will be using the infrastructure after it is built or replaced. Furthermore, if the economy expands and income increases, the cost to the individual taxpayer is less burdensome than full payment at the time of construction.

- Second, there are economies of scale that are realized in the context of an infrastructure plan. All too often, a particular improvement requires an expansion that ends up costing more money than if it had been constructed in its entirety at the outset.

- Third, avoiding crisis expenditures by good, sound, long-range planning produces savings. With a business plan in place, the community has a better sense of when infrastructure will no longer be functional; thus, before an emergency arises, the infrastructure can be repaired or replaced.

The public jurisdiction carefully factors in the amount of time necessary to plan, fund, design, and construct the projected public facilities, in conjunction with a particular development being built. Typically, this takes place within the strictures of a 5-year near-term plan where the business plan is adopted in year 1; funding is identified in year 2; the public facility is designed in year 3; and the facility is actually built in the fourth year.

Once infrastructure needs have been identified and a time frame for their completion formulated, the public jurisdiction then examines the various funding mechanisms available to pay for these facilities. Accompanying this analysis is a calculation of the source and proportion of demand from existing development, new and projected development, and other factors, such as environmental regulations that make the provision of public services more expensive and should likely be shared by the citizenry at large.

The advantages of an infrastructure business plan are evident in an era of fiscal responsibility. First, decisions regarding incurring debt require a long-range perspective due to the length of repayment periods. What may seem like a beneficial decision to meet an immediate need may not be justifiable in the face of long-term revenue demands to meet overall, and perhaps more important, capital improvement needs.

Second, public support for revenue raising is enhanced by a regularized approach to infrastructure needs. Experience shows that public support for revenue increases is linked directly to perceived confidence about the benefits that will be forthcoming if additional revenues are made available. The more clearly the benefits of a proposed program of public investment are communicated to the public, the more likely the public will support their funding. In addition, an established schedule of improvements makes it easier for residents in one region to understand that monies are being committed in other parts of the state now, and that their area will be on line for funding in the future.

Finally, there are innumerable cases where stepping back and looking at the entirety of what has to be done is much more resource-efficient than approaching investments incrementally. This is particularly true with regard to road building, where expansions soon after the road has been completed require whole new intersection alignments that, had they been done at the time of original construction, might have been half the cost.

In devising an infrastructure business plan, care must be taken to identify the source of the demand and possible sources of funds—the proverbial question of "Who should pay?". Although the current public perception is that new residents should pay for necessary capital facilities and public services, the reality is that all citizens foot the bill one way or another.

Often, after various financing sources are identified, public jurisdictions adopt present (next two years), near-term (next five years), and long-term (next 20 years) financing documents to fund the improvements. Each infrastructure business plan has a section consisting of an annual budget. The annual budget section provides policymakers with an accessible reference point for funding coordination.

The Use of General Revenues

General revenues consist of money available to governments from taxation and fees. This can be in the form of property, income, or sales taxes, building inspection and license fees, and the like. Once collected, the general revenue represents "money in the bank" to the public jurisdiction. There is no borrowing or creative finance involved with general revenue. Consequently,

expenditures of general revenue are made at the discretion of public officials. How public officials choose to spend general revenue is critical in terms of infrastructure planning.

The goal is disciplined adherence to a long-range business plan. However, this is not always completely realistic. For example, should a public jurisdiction be faced with an unforeseen development opportunity that comports with the policies but not specifics of its comprehensive plan, the jurisdiction should not be so inflexible as to turn away such an opportunity. Rather, it should be able to adjust its business plan to accommodate change. Priorities should be set within the business plan that identify the most critical projects and allot the funds most readily available. This continuum of priorities is essential because it is the insurance that the highest priority projects remain on schedule if unforeseen development opportunity jostles the planned queue. Knowing ahead of time what it can more easily postpone versus what it absolutely cannot sacrifice in terms of capital improvements affords the jurisdiction an opportunity to plan in a way that responding to a capital funding crisis does not.

The Use of Debt Financing

One of the problems confronting infrastructure planning and programming is the reality that annual revenues are subject to periodic increases and decreases that relate to national and regional economic cycles. When times are good, funds are available for infrastructure improvements needed to serve new growth and development—a circumstance that takes advantage of the economy. On the other hand, when the economy takes a turn downward, revenues decrease and the allocation of limited financial resources to long-range capital needs become more difficult. The trouble is that if funding is allocated only to current budget items as opposed to long-term capital needs, a level-of-service dilemma arises when the economy begins to grow and the needed infrastructure is not available. Some public jurisdictions address this aspect of infrastructure financing by dedicating a set percentage of their annual revenues to capital improvements each year, no matter what the exigencies are. In fact, there are public jurisdictions where a set percentage for infrastructure is established in their charters.

Long-term infrastructure planning and financing require the strategic use of debt in order to ensure that required facilities are available when needed despite insufficient cash flow. If all available funds are annually budgeted for current needs, it is unlikely that long-term needs will ever be funded. Indeed, it is probable that there will always be a full menu of "immediate" needs, each with a constituency in support of immediate funding. On the other hand, not all future cash flow should be committed to debt, so that some revenues will be available for current and unanticipated future needs.

There are no magic formulae for allocating anticipated revenue to debt versus current budget. To a certain extent, legal and market limits will dictate the amount of debt that a particular unit of government can undertake; however, the real control is a business plan that depicts relative needs for the short-, mid-, and long-term periods.

Selected Use of User Fees

User fees are one of the most equitable forms of capital facilities financing: those who use pay a fee according to the quantum of use. Toll roads are a simple example of the "user pay" equation: each time a driver uses a toll road, the user pays a toll that is used, at least in part, to repay debt incurred to construct the toll road. The principal shortcomings of user fees are the administrative and convenience costs appurtenant to

collection of the fees and the potentially disproportionate impact of user fees on the economically disadvantaged.

User fees are collected in a variety of ways. Jurisdictions collect sewer user fees by way of monthly bills for services based on historical or assumed volumes of discharges. Tolls are collected on roads in the form of payments to automatic or manual toll collectors or, increasingly, by electronic readers. Some user fees are very simple—collection of solid waste only in authorized containers that are purchased from the service provider.

The range of services that can be financed with a user fee is limited in several ways. For example, most state constitutions—including South Carolina—create a right to free and uniform local schools. These provisions have been routinely interpreted to prohibit tuition or other "access fees." It is possible in some states to finance special extracurricular programs with user fees, though the courts have been very cautious about the equal protection implications of these sorts of programs. The other primary limitation on user fees is the administrative and convenience costs imposed by user fee programs. In some states, for example, the inconvenience of periodic toll booths has proven to be an immutable obstacle to user fees for roads. This perspective is undoubtedly infected with constituent frustration with perceptions of the growing cost of government and diminishing levels of service: "Why should we have to pay for what we have always gotten free?" In other circumstances, the user fee involves complex data management problems—identifying users, the quantum of their use, and the cost of billing and collection.

User fees are currently used in the state for a variety of services including water, sewer, and solid waste. In addition, user fees are collected for recreational facilities like municipal golf courses.

The Building of Public–Private Partnerships

The timely provision of required public facilities is a complicated process that requires the public sector to anticipate national and regional economic trends, to match those trends to local development trends and entrepreneurial initiatives, and to raise the necessary funding to ensure that adequate public facilities are available when needed to serve new growth.

In some areas of the country, this complicated process is managed through adequate public facilities regulations. These programs involve the regulation of the timing of development and, in effect, require development to wait until public facilities are available. The "timing and sequencing" approach to managing the growth and development of a community begins from the premise that the community wishes to accommodate expected future growth, rather than to block it, but wishes to ensure that the timing and sequencing of new development are coordinated with the provision of adequate capital facilities and services to serve and support that new development. "Timing and sequencing" recognizes and draws on the inexorable link and interdependency between private development and public facilities and services. The growth and development of a region depends heavily on the public sector to provide a range of capital facilities and services (roads, water supply, wastewater treatment, schools, and so on). Indeed, government decisions to build capital improvements have always played an important role in opening new lands to development and thus guiding patterns of development. Accordingly, government decisions about the nature and location of public facilities and services can play a strong role in guiding development to particular locations. On the other hand, government infrastructure decisions are often responsive to private development patterns, with the decision to open new

lands to development coming from the private sector, with an expectation that the government will step in to provide or extend the necessary facilities and services into the area.

One of the most common forms of public-private partnerships is a concept that is sometimes referred to as "front-ending" agreements. Under this concept, the public sector establishes an infrastructure business plan that schedules improvements based on anticipated growth trends and available financial resources. If infrastructure to serve a particular development is not scheduled for installation in the near future, the developer has three alternatives: 1. wait until the needed infrastructure is installed according to the long-range capital facilities plan; 2. persuade the local government to amend the business infrastructure plan to give the needed infrastructure priority; or 3. agree to install the infrastructure at his own expense, with an understanding that he will be reimbursed when funding becomes available under the business plan.

At the other end of the spectrum of public-private partnerships is the privatization of infrastructure, whereby the public component of the partnership is limited to establishing level-of-service standards under which private operators provide service on a for-profit basis. Water and electricity are currently provided in South Carolina on a private basis, subject to regulations imposed by the state. In other parts of the country, sanitary sewer service, solid waste management, and—in some limited circumstances—roads are provided by private operators under franchise agreements with a local government.

The essence of the public-private partnership is maximizing the economic potential of both the public and private sectors. For example, it is a simple fact that the public sector has the ability to borrow money on more favorable terms than does the private sector.

On the other hand, the private sector has significant advantages in terms of competitive bidding and economies of scale in constructing improvements. For example, if a major arterial passes through a large parcel of land that is proposed for development, it is very likely that bidding the construction of the arterial along with the local improvements required for the development of the parcel will result in overall savings as bidders look at the project as a whole. And it is not just that the bidding process can be more effective: there are economies of scale that can be realized, as only one contractor incurs certain "soft" costs as opposed to multiple contractors. Similarly, the amount of "cutting and patching" that is required to meld separate public and private construction activities can be reduced when infrastructure is provided by a single contractor team.

Finally, public-private partnerships can be an effective means of promoting more efficient patterns of development. One of the most problematic aspects of real estate development is uncertainty—uncertainty in terms of development approval, availability of infrastructure, and the market. One of the benefits of a partnership approach to development is that much of the uncertainty of development approval and infrastructure is eliminated.

STATE REVENUE-RAISING AND FINANCING MECHANISMS

A. STATE REVENUE-RAISING MECHANISMS

By far, most of South Carolina's general fund revenue is generated through the individual and corporate income tax and the state sales tax. The individual income tax is the top revenue-generating source for the state, responsible for more than 40 percent of the state general fund. The individual income tax and the state sales tax contribute more than

three-quarters of the state general fund annually.

CURRENT TAX SOURCES

Income Taxes

Jurisdictions Currently Authorized: State.

Description: The income tax is one of the most attractive sources of revenue generation because it is so responsive to economic growth and inflation, and it is widely seen as equitable to the state's 46 counties. Sixteen metropolitan and major coastal counties contain about 72 percent of the population and contribute about 78 percent of the state's individual income tax revenues. Greenville, Charleston, and Richland counties account for about one-third of this 16-county total. The most populous 22 counties generate almost 88 percent of the state's individual income tax revenues. Total estimated fiscal year 1996-97 revenue from income taxes is about $2.1 billion.

Obstacles: High personal and corporate income tax rates tend to erode South Carolina's current image as a business-friendly state.

Remedies: Income tax rates should not significantly exceed those of other southeastern states.

Retail Sales Tax

Jurisdictions Currently Authorized: State.

Description: The retail sales tax is South Carolina's second most important source of general fund revenues. The current state sales tax is set at a rate of 5 percent and has broad coverage. It is particularly critical that South Carolina maintain a growing and viable retail sales base because all state revenue generated through the sales tax is earmarked for the state's educational system. Areas of the state that serve as major population and employment cores also serve as centers of retail sales activity. Data confirm that these areas serve as retail sales magnates, drawing in consumers from outlying counties to shop for goods. Almost 82 percent of the sales tax was generated in the 16 metropolitan and major coastal counties. The 22 most populous counties are responsible for almost 90 percent of the total net taxable sales. Total estimated fiscal year 1996-97 revenue from retail sales taxes is about $1.6 billion.

Obstacles: Merchants near state borders may suffer revenue loss if consumers opt to make their purchases in states with lower state sales taxes.

Remedies: State retail sales taxes cannot be raised to significantly higher rates than those of neighboring states.

State Motor Fuel Tax

Jurisdictions Currently Authorized: State.

The current tax of 17 cents per gallon has been in effect since January 1, 1989. A portion of this tax is currently shared with counties and municipalities. Gas tax revenues are required to be spent for highway and road construction, improvements, and maintenance. South Carolina's 17 cents per gallon tax rate exceeds the rate in only five other states. Whereas Alaska, Florida, Georgia, New Jersey, and Wyoming have lower tax rates, they also have a much broader basis for revenue support provided to state highways. Total estimated fiscal year 1996-97 revenue from motor fuel sales taxes is approximately $375 million.

Obstacles: As in all retail sales taxes, vendors near state borders will likely experience "leakage" of revenue to lower-taxed states if the tax differential is great enough.

Remedies: Ensure that the South Carolina motor fuel tax is not significantly greater than those of the surrounding states.

Cigarette/Liquor Taxes

The state currently collects a 7-cent-per-pack tax on cigarettes and tobacco products, which is all remitted to the state. The state also collects taxes on alcohol. The amount of tax imposed varies with the type of beverage. The state of South Carolina shares 4.5% of general fund revenues (of which these two sources are a part) with cities and counties based on population.

Obstacles: State does not usually want to transfer more even if it collects more.

Remedies: Encourage increases in state collected revenues to be shared with locals.

LOCAL REVENUE-RAISING AND FINANCING MECHANISMS

One of the most common complaints from local officials is that when the 1975 *Local Government Act*, or *Home Rule Act*, became statute it provided structural home rule for local governments but did not address the issue of fiscal home rule. The Act gave localities forms, or structures, of government to select for self-governing but it did not broaden the ability of cities and counties to *raise revenue*. In other words, cities and counties can do practically anything necessary as far as determining what services they want to provide, but they have little latitude in deciding how they wish to pay for those services. This translates into a long-term dependence on the property tax as the local revenue mainstay.

South Carolina's cities and counties are very much dependent on the property tax as the major general fund revenue source. In fiscal year 1995, the property tax generated approximately 49.7 percent of all *county* general revenue in the state and 67.2 percent of all "own source," or locally generated revenue. Similarly, *municipalities* were dependent on the property tax for 38.6 percent of their general revenue and 47.4 percent of their locally generated revenue.

According to annual polls conducted by the U.S. ACIR, the property tax ranks consistently first or second as the least popular tax in the country based on citizen opinion of fairness. Evidence of this public attitude is seen in South Carolina as calls for property tax limits and alternatives continue to surface.

In addition to public attitudes regarding the property tax, one must also question the ability of the property tax, or any single tax for that matter, to generate sufficient local government revenue on a long-term basis. In 1984, the SCACIR authored the original *Local Government Finance Act* in an attempt to provide cities and counties with general revenue alternatives to the property tax. The Commission operated on the assumption that unprecedented future service demands could not be funded adequately through dependence on a narrow general revenue base. A diversified local tax base was viewed as the best means by which local governments could finance their futures. Most importantly, varying local governments have different needs and preferences. No single alternative revenue option is attractive to all localities in all areas of the state. For this reason, the *Local Government Finance Act* offered a menu of six local option revenue sources. These sources included:

- Local Option Sales Tax
- Local Income Tax
- Local Occupational (payroll) Tax
- Local Admissions Tax
- Motor Vehicle License Tax
- Coin Operated Device Tax

Of these revenue sources, only the Local Option Sales Tax was enacted for use by cities and counties as a general revenue source. This legislation passed

during the 1990 General Assembly Session. An adequate state growth policy usually offers multiple fiscal options for use by cities and counties to finance their future. Only through the use of a diversified tax mix will the state's fastest-growing communities meet increased service demands. Additional revenue options would also be useful in those areas of the state that are not experiencing substantial growth and must depend on a stagnant or declining property tax base to generate operating revenue. A menu of existing and alternative revenues is discussed below.

A. LOCAL REVENUE-RAISING MECHANISMS

The revenue sources available for new infrastructure at the local level are quite varied, but they can, in principle, be placed in a few general categories. First, general revenues in the form of taxes and fees may be used to finance infrastructure. The most common source at the local level is the property tax, but other sources of general revenue might also be used. The money may be used to build infrastructure directly or to pay back the bonds used to finance it. This mechanism can be used by special assessments on a subset of taxpayers. Second, a charge may be levied for a service (e.g., water provision) and part of the revenue from the charge may be used for infrastructure finance, again either directly or as a revenue source for bond funding. Finally, a charge may be levied based on the anticipated cost of providing new service to development. Typically, such fees are accumulated to provide future capacity expansion rather than used to fund bond measures.

CURRENT TAX AND FEE REVENUE SOURCES

Property Taxes

Jurisdictions Currently Authorized: Municipalities, counties, school districts, special districts.

Description: The property tax is used by South Carolina cities, counties, schools and special districts primarily to raise revenue to fund the general operations of local government. Property tax administration, governed by the South Carolina Constitution, the state's taxation laws, and regulations of the Department of Treasury, involves the process of assessment, equalization, levy and collection.

South Carolina assessment ratios are set by statute at either 4%, 6%, 9.5%, or 10.5% of market value. These are as follows:

a. Owner-occupied residential property assessed at 4% of market value.
b. Agricultural property assessed at 4% for private and 6% for corporate based on a use value.
c. Manufacturing, business personal property, and utility property assessed at 10.5% of market value.
d. Private carlines, airlines, railroads, and pipelines assessed at 9.5% of market value.
e. All other property (commercial and residential nonowner-occupied) assessed at 6% of market value.

Property tax proceeds may be used for any purpose for which the unit of government can lawfully expend funds. Property taxes can help finance infrastructure development, either as:

- a direct funding source for capital projects, or
- a repayment source to pay debt service on municipal bonds, or
- a source of security on General Obligation Bonds retired by another revenue source, such as sewer fees.

As with any local tax source that requires voter approval, the degree to which property taxes are a viable option for funding infrastructure projects is subject to the political and economic climate of the requesting entity.

Obstacles: Property taxes are subject to voter approval. Since property taxes have been heavily utilized by local jurisdictions, there tends to be strong voter resistance to the extension of this tax.

Local property taxes are also increasingly the target of anti-tax forces and are vulnerable to caps and other kinds of voter-initiated limits (e.g., Proposition 13 in California and Amendment 1 to the Colorado Constitution).

Much of the property in the state is exempt from taxation, such as federally owned lands, government owned real property at any level, and land held by churches and charities.

Remedies: Jurisdictions can evaluate the potential of other sources of revenue. Municipalities and counties have clear taxing powers; special districts may require legislative authorizations.

Local Option Sales Tax

Jurisdictions Currently Authorized: Municipalities and counties.

Description: In order to enact a local option sales tax, a successful county-wide referendum must be held. When the tax is adopted, it applies on a county-wide basis. Both municipal and county governments are required to use 71 percent of all revenue generated by the tax to roll back real and personal property taxes. The remaining 29 percent may be used at the discretion of the city or county as general revenue. This requirement may diminish the ability of this revenue source to assist localities in meeting new infrastructure needs, addressing increased service demands, and complying with federally mandated expenditures. In addition, many local officials have also had to commit more than 71 percent of generated revenue towards rolling back property taxes in order to gain political support for the tax. In some cases, 100 percent of sales tax revenue received has been applied to replace property tax revenue. In addition to the expenditure requirement, counties that generate more than $5 million in sales tax revenue must contribute up to 5 percent of their revenue to a supplemental fund. This fund is used to supplement those counties that generate less that $2 million in sales tax revenue. Only those counties that have adopted the tax are eligible to receive these funds. Total estimated fiscal year 1996-97 revenue from local option sales taxes: $101 million.

Obstacles: Merchants claim that local option sales taxes drive retail business elsewhere.

Remedies: A small sales tax (1% or less) piggy-backed onto a state sales tax and collected by the state is often unnoticed by local consumers.

Business License Fee

Jurisdictions Currently Authorized: Municipalities and counties.

Description: A business license fee is often required of businesses that operate within a municipality. The fee, which is nominal and paid annually, is applied to both businesses that are physically located within the taxing jurisdiction and enterprises that conduct business within the jurisdiction. It is used to supplement general revenues, some share of which can purchase facilities directly or pay off bonded debt.

Obstacles: Business license fees are often characterized as anti-business although the amount of most business fees is such that they do not have that effect. In addition, the administrative cost of collection can be problematic unless there are other taxing or collection incidents to which collection of the fee can be appended.

Local Admissions or Amusement Taxes

Jurisdictions Currently Authorized: Municipalities and counties.

Description: This local income is often not collected on the local level. The state collects an amusement device tax, a share of which (typically 20%) is distributed among counties based on population. Municipalities over a certain population size may also levy an amusement device tax.

Obstacles: Each new tax requires some system of collection. Both the cost and the administration can be burdensome to jurisdictions. Special local taxes can make the levying jurisdiction less attractive than its neighbors as a place to do business, or simply to live.

Local Accommodations Tax

Jurisdictions Currently Authorized: Municipalities and counties having hotel/motel accommodations.

Description: This tax provides that a two percent tax be charged on all lodging bills. Proceeds, minus the cost of administration, are returned quarterly to the municipality or county in which they are collected. Cities and counties, however, are restricted in how this revenue is spent. The first $25,000 received goes to the general fund of the city or county and is exempt from any regulation of expenditure; 25 percent of the balance is allocated to a special fund for advertising and promotion of tourism; and the remaining 75 percent must be used for "tourism-related expenditures." Some of these expenditures include the promotion of tourism, arts and cultural events, and the construction and maintenance of facilities for civic and cultural activities. Expenditure mandates tied to the accommodations tax limit the ability of the tax to be viewed as a "general" revenue source. The law also contains an equalization provision that requires localities that generate substantial amounts of revenue to share revenue with areas that generate minimal amounts. Total estimated fiscal year 1996-97 revenue from local accommodations taxes is about $125 million.

Obstacles: Historically, local accommodations taxes are used for tourism promotion and not for general purposes. Although they are popular with the general public, they are hotly contested by the tourism industry, which does a good job of ascribing anti-competitive effects to such impositions.

Rental Car Tax

Jurisdictions Currently Authorized: Municipalities and counties.

Description: All jurisdictions currently levy a 5% rental car tax to offset local property tax liability on automobiles.

Obstacles: Each new tax requires some system of collection. Both the cost and the administration can be burdensome to jurisdictions.

Remedies: Require collecting business to forward revenues to a special account in the municipality or county.

ALTERNATIVE TAX AND FEE REVENUES—MORE LIKELIHOOD OF ACCEPTANCE

Business Income Tax

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: Counties and municipalities, upon voter approval, may impose a business income tax on the net income of the business. The mechanics of a business income tax are similar to a business license fee.

Obstacles: A business income tax is generally viewed as anti-business and may have an adverse impact on business recruitment. The economic implications of a business income tax

may not be sufficient to constitute a real deterrent, but in the highly competitive world of business recruitment, competitors find it easy to cast a competitor's tax environment in a negative light.

Franchise Taxes or Fees

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: Franchise taxes or fees are increasingly used to fund local government revenue needs. Cable TV has been a particularly fertile arena for local government revenues.

Obstacles: Almost none if tax rates are low.

Utility Taxes

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: Utility taxes are a common source of revenue that is used in other states for local general revenue (and thus infrastructure payment) purposes.

Obstacles: To the extent that utility taxes make such facilities less competitive, utility fees may be unpopular with economic development interests. Utility taxes can be particularly problematic when imposed on customers with high energy-consumption needs.

ALTERNATIVE TAX AND FEE REVENUES—LESS LIKELIHOOD OF ACCEPTANCE

Local Gasoline Taxes

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: A county or city-wide gasoline tax applies to the sale of petroleum products. Proceeds from a local gasoline tax are usually restricted to fund highway and road construction, improvements, and maintenance.

Obstacles: Local option motor fuels taxes have been effective in a number of states; however, they are difficult to pass at referendum, unless the purpose for the levy is limited and clearly described. In addition, local option gas taxes can have a dislocating effect if they are not imposed uniformly throughout a region. If county A imposes a levy, but county B does not, then there will be some shift in the locus of fuel purchases, as well as the location of transportation-dependent uses, which tend to concentrate in areas with the lowest fuel costs.

Remedies: Specify carefully the purpose of the tax and keep the rate increase as low as possible.

Local Vehicle Registration Fees

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: Some states permit municipalities and counties, upon voter approval, to impose a local vehicle registration fee. This fee is added to the vehicle registration fee currently collected by the state. Revenues from this source are restricted to highway and road construction, improvements and maintenance.

Obstacles: Although significant for infrastructure finance, local vehicle registration fees are regressive for lower-income families. This could be overcome with a sliding registration fee: "x" dollars for the first vehicle per household and 2 or 3 times "x" for additional vehicles, under the assumption that poorer households have fewer vehicles.

Remedies: Careful crafting of the registration fee to account for both uniformity and equity of application.

CURRENT SPECIAL ASSESSMENT AND DEVELOPER EXACTION REVENUE SOURCES

Special Assessments

Jurisdictions Currently Authorized: Municipalities and counties.

Description: To fund and finance infrastructure projects that directly benefit specific properties, South Carolina law allows cities, counties, and special districts to utilize special assessments. Since special assessments are levied on property, they are similar to property taxes. However, unlike property taxes, special assessments are specifically designed to recover part or all of the cost of an improvement that specially benefits an individual property.

Special assessments are not generally used for projects such as sewer or water treatment facilities, or community centers, since the community as a whole rather than specific property owners benefits from the project. It should be noted, however, that so long as the subject matter of an assessment is authorized, special assessments can be imposed if the benefit received is equal to or greater than the assessment imposed. Special assessments can be levied against properties to fund infrastructure such as:

- streets
- sidewalks
- water and sewer improvements
- neighborhood recreational facilities and equipment

Costs associated with improvements are assessed against properties based on formulas that relate the charge against the parcel of property to the services or benefits received. Formulas are usually based upon frontage, square footage, or a combination of the two. Infrastructure projects financed through special assessments may be structured on a "pay-as-you-go" basis, or special assessment proceeds may be used to pay the debt service on bonds. The decision regarding which financing mechanism to use depends on the type and cost of project and how property owners remit their assessments—either in lump sum or installment payments.

Obstacles: The principal obstacle to the use of special assessments is public resistance to the imposition of assessments on existing properties and the due process implications of the approach. Under most special assessment laws, those assessed must have a meaningful opportunity to contest the reasonableness (the relationship between the benefit and the assessment) of a special assessment. In many states, the practicality and usefulness of special assessments are frustrated by individual hearing requirements.

Remedies: Careful attention paid to who is benefiting from the improvement versus who is being assessed.

Developer Exactions

Legal Authorization: Established by local ordinance.

Jurisdictions Currently Authorized: Municipalities and counties.

Description: Established by local ordinance, developer exactions, which are similar to system development charges, are cash or in-kind payments made by real estate developers to a local government to help defray some or all of the added public infrastructure costs resulting from a particular development. Developer exactions differ from impact fees in that they may be negotiated on a project-by-project basis and vary as to the amounts collected, the timing of payment collections, and the uses of funds.

Exactions are most common among smaller communities that lack the sophistication to impose schedules of

impact fees or enact other revenue sources. Exactions are also used in combination with special assessments in areas that face rapid growth and the consequent strain on public facilities. Exactions can come in the form of a dedication of land for park facilities and open space, road construction, or construction of sewer and water facilities needed to serve new residential development.

Obstacles: Law requires that exactions be earmarked and maintained in separate accounts for each type of exaction.

The income stream from exactions is uncertain and therefore difficult to predict.

A recent U. S. Supreme Court decision may place a burden on the government to demonstrate rough proportionality in the amount of the exaction in some sort of "individualized determination."

Remedies: Provide statutory or other clarification of "exactions" and their permitted uses.

INCREASED PROPERTY VALUE PAYING FOR IMPROVEMENTS

Economic Improvement Districts (EIDs)

Jurisdictions Currently Authorized: Municipalities and counties.

Description: Cities and counties in other states are authorized to establish economic improvement districts under state statute. A city may make assessments "upon the lots which are specifically benefited by all or part of the improvement" for the cost of economic development projects such as:

- parking lot improvements
- landscaping of public areas
- business promotional activities

Economic improvement district assessments are often levied for a maximum term (e.g., 5 to 10 years). Levies may not exceed in any one year a percentage of the equalized value of the property within the district (typically 1%). Usually only properties zoned for industrial or commercial uses are assessed; no residential properties are assessed.

Obstacles: Special assessments are applied according to the benefit derived from a project. Therefore, any project that is of general benefit, such as a wastewater treatment plant, cannot utilize special assessments.

Not all assessed parties will accept the assessment.

Not all assessed parties pay their assessment on time or at all. Recessions have a noticeable effect upon the rate of delinquency; strong growth periods cause increases in prepayments. These factors make EIDs a somewhat unreliable revenue source requiring a large reserve or "guaranty" fund (as used in the state of Washington through its Special Assessment Bonds).

There has been increasing scrutiny of these kinds of districts from the federal level regarding their use in obtaining tax-free financing for private activities.

Remedies: Most state laws nationally limit assessments to the cost of the improvement only. They should be expanded to include the cost of establishing reserves and/or a percentage over the cost to provide greater protection from delinquencies and negative arbitrage (investment loss relative to interest cost). Economic Improvement Districts should be permitted to apply their special assessments to special assessment financing, if so desired. Current law appears to prohibit this.

Tax Increment Financing (Urban Renewal Districts)

Jurisdictions Currently Authorized: Municipalities and counties.

Description: Unlike special assessments, which are established to make infrastructure improvements that benefit specific properties, an urban renewal district is established to remedy "blighted" conditions that may exist within a specified area of a community. Most state laws define those conditions that constitute "blighted" and establish an administrative structure known as an urban renewal agency to oversee the process. Tax increment financing can be used for infrastructure needs such as streets and rights-of-way, utilities, property acquisition and development, and housing.

At the time a tax increment financing district is created, property tax values within the district are "frozen." As these properties are developed and their assessed value increases, the urban renewal agency keeps the property tax difference, or increment, between the new tax proceeds resulting from the development and the frozen base. The property tax increment revenues can then be used to pay the cost of infrastructure improvements within the district.

Tax increment financing districts are often limited to a maximum amount of the assessed valuation of the municipality.

Obstacles: Extremely vulnerable to variations in the tax rate, whether natural or imposed by changes in law.

Tax increment financing may be unpopular with other downtown or redeveloping areas that believe they are denied revenues that would otherwise be made available to them. Their opposition makes it difficult to establish an urban renewal district.

Most statutes limit tax increment financing to areas that contain slums or are blighted.

The host taxing authorities who give up the increment are generally opposed to tax increment financing unless there is otherwise a clear benefit to allowing the diversion of future taxes. This is particularly true when the host taxing authority's obligations increase as a result of the development.

Since these are funded by property tax increments, all of the problems discussed above relating to property taxes apply to these districts with the exception of the voter approval requirement. Although not required, voter approval is still solicited by some jurisdictions, since urban renewal districts are usually referred by petition if not offered to a vote initially.

Remedies: Assure that tax increment financing is utilized only where growth would not occur without public investment.

USER CHARGES

User Fees

Jurisdictions Currently Authorized: Virtually all local public corporations, i.e., municipalities, counties, special districts, ports, and the like.

Description: User fees are another common method of paying for infrastructure improvements such as water, sewer, and storm drainage. System user fees are used to pay the ongoing operating and maintenance cost of a public facility; they also may be used to pay bonded indebtedness for construction and improvements.

Unless a program has been established for some time and has an existing rate-payer base, the cash flow from user fees generally does not permit direct financing of infrastructure projects, except where a portion of the user fee is

accumulated over time for future projects. In most cases, accumulation of user fees requires rate increases that are both well beyond immediate cash needs and are politically unpopular. Therefore, a user fee system for large infrastructure projects may support the debt service of a financing resource such as a bond issue (General Obligation or Revenue Bond).

User fees are particularly desirable because they promote conservative behavior due to the direct relationship between the quantum of use and the amount of the fee.

Obstacles: Certain methods of collecting user fees involve a significant amount of user inconvenience. For example, toll roads require periodic interruptions of user movements to collect tolls.

User fees are normally set by an appointed or elected body; as a result, they tend to lag actual costs because constituents resist any increase in costs—whether a "tax" or other charge.

Rates that significantly exceed neighboring rates will decrease competitiveness or make an area less attractive to development. Rate payers resist as fees escalate.

Major increases in rates can affect the utilization of the service (e.g. elasticity of demand) and thus not produce as much revenue as expected.

Remedies: Many major capital projects cost more than reasonable rates can deliver, especially in small areas. State assistance may be needed.

Wholesale Service Contracts

Jurisdictions Currently Authorized: Special districts.

Description: Utilities such as water and sewer that may have excess capacity provide service to other public entities located outside their service area boundaries through wholesale service contracts. These agreements set forth the terms and conditions under which operating and capital costs are allocated to the wholesale customers. Wholesale service contracts are a cost recovery mechanism and can be combined with other funding and financing resources to meet the cash flow requirements for infrastructure construction and operations.

Obstacles: Selling outside may become more lucrative than pooling service within boundaries.

Remedies: Regular monitoring of sales accounts.

Impact Fees

Jurisdictions Currently Authorized: Cities, counties, and certain special districts.

Description: Impact fees are charges assessed against new properties to provide for both current and future infrastructure capacity needs. Impact fees can be used only to fund capital improvements in connection with water supply treatment and distribution; waste water collection, transmission and disposal; drainage and flood control; transportation; public building construction; and parks and recreation. Impact fees cannot be used for the costs of operations or routine maintenance.

Obstacles: Developers resist paying these fees, which add to their up-front costs. These revenues can vary widely from year to year and often do not produce sufficient revenue for major projects like treatment plants.

Revenues are not available until growth occurs. Impact fees cannot fund major infrastructure in advance of growth.

Remedies: Ensure that fees bear a strong relationship to the cost of the infrastructure that is being provided.

B. FINANCING MECHANISMS

One of the most critical challenges facing local governments as they strive to meet new growth demands is the *financing* of required capital projects. Assuming a city or county council does identify funding sources for a project, they may then face another major impediment—their debt ceiling. This problem is not critical if a project is one that generates revenue to pay for itself, such as a water system. Rather, debt limitations for local governments in South Carolina pertain to general obligation debt, debt that is backed by the full taxing power of the issuing locality. Projects typically funded by incurring this debt include non-revenue generators such as city halls, county courthouses, and administration buildings.

The local government general obligation debt limitation in South Carolina is the same for cities, counties, and school districts. This "debt ceiling" is equivalent to 8 percent of the assessed value of the taxable property in the jurisdiction. Any general obligation debt that would exceed the 8 percent limit may be incurred only by a favorable referendum of the voters of a jurisdiction, an action that has become increasingly more difficult to achieve.

In 1989, the SCACIR issued a comprehensive report examining the issue of local government debt and state constraints. The report found that high growth areas—such as the state's urban and major tourism counties—found debt limits burdensome as they attempted to reinvest in community facilities to deal with their present and future growth. Most importantly, the Commission concluded that local government debt levels should be limited, but that the demand for new public facilities required that the present constitutional debt limit, and debt issues in general, be reexamined to determine their impact on infrastructure development.

In examining the present debt limit, the Commission noted that, although localities are heavily reliant on property taxes, only 40 to 45 percent of the average local government budget was funded through the property tax. Cities and counties also rely on business licenses, user fees, and intergovernmental funds to add to their revenue picture. The Commission concluded that for a debt limitation to be meaningful and equitable, it should be imposed on the entire local government's revenue composition, rather than being based solely on property values. The recommendation was adopted to continue to limit local borrowing, but that the limit should be expressed as a percentage of a local government's total operating revenue.

The state's low debt limit has resulted in many local governments electing to use lease-purchase agreements to meet capital needs. These agreements do not count toward their general obligation debt limit. In general, this practice is more costly to localities and taxpayers, as interest rates are higher than for conventional bonds.

DEBT FINANCING

Infrastructure *debt financing* is distinguished from *pay-as-you-go funding* in that, with the former, money is borrowed by issuing debt obligations and then repaid over time.

Tax-Exempt or Taxable?

The municipal bonds described in this section can be either tax-exempt or taxable. The interest on *tax-exempt* municipal bonds is free from federal and state income taxation; therefore, interest rates paid by the municipal issuer are lower than those paid on taxable bonds. This can result in substantial cost savings for local jurisdictions undertaking infrastructure development.

In general, federal law specifies that projects which serve a "public purpose"

qualify for the lower-cost tax-exempt financing. Since most local infrastructure projects, such as streets, sewer, water, and schools serve a "public purpose," they qualify for the more appealing tax-exempt option.

There are private activity limitations that are imposed which generally mean that the revenues by which the bonds are repaid must be derived from public sources. Under some interpretations of federal law, the beneficiary of a particular program must not be controlled by a single entity; thus, the practical effect of the program is public subsidies to what is otherwise a private undertaking.

The *taxable* bond option exists for an issuer if, for some reason, the infrastructure project under consideration cannot be financed with tax-exempt debt. This is most common where the project is deemed to be "private purpose" under federal arbitrage law and is not an "exempt purpose."

The market for taxable municipal debt has generally been more responsive to large issues and recognized municipal issuers. Moreover, the interest rate on taxable municipal bonds generally ranges from 200 to 300 basis points (2% to 3%) above tax-exempt rates.

CURRENT DEBT FINANCING MECHANISMS

General Obligation Bonds

Jurisdictions Currently Authorized: Municipalities, counties, and special service districts.

Description: Commonly used for infrastructure development, General Obligation Bonds (GOs) are a long-term borrowing backed by the "full faith and credit" pledge of the municipality's available general fund revenues and unlimited taxing power. Because these GOs have the unlimited taxing pledge of the municipal issuer, they are also referred to as Unlimited Tax General Obligation Bonds.

There are two primary types of General Obligation Bonds:

GO Bonds paid *solely from property taxes.*

GO Bonds paid *from another revenue source*—such as sewer fees (often called "double-barreled" or "self-supporting" GO Bonds)—provide the general obligation taxing power of the issuer as security if the revenues are not sufficient to retire the bonds.

General Obligation Bonds have been used to fund a variety of infrastructure needs and have been relied on almost exclusively by small- and medium-sized issuers lacking a strong revenue base to back Revenue Bonds. The full faith and credit pledge helps to achieve the lowest possible borrowing costs for municipalities.

General Obligation Bonds' advantages include:

- The overall costs to issue are the least of any type of bond.
- The interest cost is the least of any type of bond.
- Property taxes can be levied outside a municipality's operating levy to pay debt service.

Obstacles:

- Voter approval is required.
- General obligation debt, which applies to the jurisdiction's debt limit, is increased.

Remedies: Effectively communicate the importance of the bond issue to local residents. Keep debt obligations as low as possible.

Limited Tax General Obligation Bonds

Jurisdictions Currently Authorized: Municipalities, counties, and special districts.

Description: Limited Tax General Obligation Bonds (LTGOs) are the same as Unlimited Tax General Obligation Bonds except that the issuer does not have the legal ability to levy unlimited taxes as a pledge of security. Rather, the bonds are secured by available general fund revenues and whatever existing taxing power a jurisdiction has (such as any unlevied tax base amounts).

LTGOs are perceived to have a higher risk and therefore carry a higher interest rate than full GOs. The magnitude of this difference in interest rates depends on the financial condition of the issuer.

Obstacles: Even GOs fully supported by revenues that are not "taxes" cannot be issued for other than capital construction and improvements.

Very small or poor jurisdictions may have insufficient debt capacity (derived from statutory debt limitations) for certain types of projects. Utility GOs (such as for water and sewer purposes) are exempted from limitations, but police/fire stations, parks, open space, recreational facilities, libraries, and the like are subject to the limitation.

Remedies: Obtain a legislative or court definition of what is contained in "capital construction and improvements," especially:

- land,
- equipment necessary to the functioning of the facility,
- equipment normally a part of a similar facility,
- easements.

Revenue Bonds

Jurisdictions Currently Authorized: Municipalities, counties, and special districts.

Description: Revenue Bonds are long-term obligations that are payable solely from a designated source of revenue generated by the project that was financed. No taxing power or general fund pledge is provided as security. Unlike General Obligation Bonds, Revenue Bonds are not subject to a jurisdiction's statutory debt limitation, nor is voter approval required.

The interest rate paid on Revenue Bonds reflects the quality of the revenue stream supporting repayment of the bonds. Revenue Bonds have been used to fund projects such as water, sewer, and storm drainage facilities and improvements, and revenue-producing facilities such as electric facilities.

To enhance the marketability of Revenue Bonds, issuers typically establish debt reserves and agree to maintain rates and charges at levels that are more than sufficient to meet all operating and debt service requirements. Because of the limited security offered to bond holders, Revenue Bonds usually carry a higher rate of interest than that paid on General Obligation Bonds.

Advantages of Revenue Bonds:

- Voter approval is generally not required.
- Property taxes may not be used to pay debt service, nor is there any risk to the general fund of a municipality.

Disadvantages of Revenue Bonds:

- Interest rates can be substantially higher than General Obligation Bonds.

- There is a greater risk of default, which would seriously impair a local government's ability to issue any type of bonds in the future.

- Due to the higher risk, there are many more bond "covenants" and other restrictions on the use of revenues that secure the bonds and on operation of the facility.

Obstacles: Usually the most risky of debt financings and therefore require additional security and costs. These come in the form of:

- Reserve funds,
- Higher interest and issuance costs,
- Rate coverage,
- Covenants, including insurance and limitations on use and sale, and
- Sometimes, security interest or lien on land and facility.

Small municipalities often experience a lack of market receptivity for their Revenue Bond issues without extensive security.

Remedies: Clarify authority for Revenue Bonds for all jurisdictions.

Types of Revenue Bonds

Enterprise Revenue Bonds

Description: This is the standard Revenue Bond, which is secured and paid by an identified revenue stream and is issued under specific statutory authorization.

Special Assessment Bonds

Description: Special Assessment Bonds are secured by assessments made against properties that benefit from local infrastructure improvements. Because Special Assessment Bonds are not secured by a general obligation pledge, they are less marketable than other types of bonds and carry a higher interest rate.

In addition, because of the lack of property tax support, Special Assessment bond interest rates may vary by bond issue, based on the property values that serve to secure the bonds. Significant reserve funds are often required to secure the bonds.

Lease Rental Revenue Bonds

Description: This financing technique involves a jurisdiction leasing a facility from a governmental "authority" that has issued debt for the facility's construction. The annual lease payments from the jurisdiction match the debt service due on the bonds. The lease operates as long as the bonds are outstanding. The jurisdiction may have the option to purchase the facility at any time by paying an amount sufficient to pay the principal and interest on the bonds.

Industrial Development Revenue Bonds

Description: These bonds are issued on behalf of private entities in order to achieve some public purpose, such as pollution control, economic development, etc. Extensive abuse forced Congress to severely restrict the use of this type of bonding.

Short-Term Debt Financing Options

Jurisdictions Currently Authorized: Municipalities and counties.

Description: Various types of tax-exempt notes, such as bond anticipation notes (BANs), revenue anticipation notes (RANs), and tax anticipation notes (TANs), are issued in anticipation of, and secured by, some other financing source. A local government may receive a commitment of state grant funds at a future time and may in turn issue grant anticipation notes (GANs). In periods of market instability, the generation of jurisdiction anticipation notes allows a public to delay a long-term debt issue until the market climate is more

favorable, thereby potentially saving on interest costs.

Obstacles: Short-term borrowing is generally available, but bank rates may be higher than tax-exempt rates if borrowings are excessive during the calendar year.

Remedies: Permit jurisdictions to borrow in the short term, for longer than one year, from other funds of the jurisdiction. For instance, a jurisdiction may have a large utility fund that could provide two-year interim financing for a nonutility project at rates comparable to federal taxable rates, thereby saving issuance costs and flexible repayment terms.

ALTERNATIVE DEBT FINANCING MECHANISMS—MORE LIKELIHOOD OF ACCEPTANCE

Tax Increment Bonds

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: This type of debt security is secured by the growth in property tax revenues that results from urban renewal districts. The bonds can be used to finance infrastructure improvements within an urban renewal district established by a city's or county's urban renewal agency.

The necessary growth in assessed value is not guaranteed. Consequently, tax increment bonds are often riskier than revenue bonds secured by a more dependable revenue stream, and thus require higher interest rates in order to attract investors.

For *"Obstacles and Remedies"* see discussion on Tax Increment Financing (Urban Renewal Districts) earlier in this report.

ALTERNATIVE DEBT FINANCING MECHANISMS—LESS LIKELIHOOD OF ACCEPTANCE

Certificates of Participation (Lease Purchase Bonds)

Jurisdictions Potentially Authorized: Cities, counties, and special districts.

Description: Certificates of Participation (COPs) are a financing technique for facilities, property, and equipment that utilizes the leasing power of local governments. Unlike General Obligation Bonds, there is no new tax levy authorized; therefore, there is no voter approval requirement. COPs are also not subject to statutory debt limits.

In general, Certificates of Participation represent "participation" in a tax-exempt lease, which is an agreement between a municipal government and a governmental agency, authority or commercial bank trust department. If a governmental authority is used, the authority performs the initial financing, and the municipality retires and secures the debt through lease payments. If a commercial bank trust department is used, the municipality performs the initial financing and then assigns the ownership of the facility to the trustee to whom the municipality makes the lease payments. Revenues to pay the COPs can come from a number of sources depending on the type of project financed. For example, COPs issued to finance a community facility or convention center may be paid back from the revenues generated by the facility that are not needed for operations, as well as by special taxes such as hotel/motel taxes or business license fees.

In both cases the local government owns the project financed by the COPs when they are retired, thus the name Lease Purchase Bonds.

Bond counsels have frowned upon COPs as a financing instrument for major distribution infrastructure projects such as for water and sewer systems. Municipal buildings such as city halls, public service buildings, fire or police stations are better suited to COPs because they conform to the leasing concept.

Advantages of Certificates of Participation:

No voter approval is required. General fund revenues that are not otherwise obligated can be used to pay debt service if needed, especially if the projections of special taxes or revenues are overly optimistic. This is at the option of the governing body in charge when the need arises, and therefore is not a legally binding commitment.

Disadvantages of Certificates of Participation:

A non-appropriation clause is required for the general fund support, which carries an interest rate penalty.

The overall costs to issue are more than General Obligation Bonds.

The interest cost is more than General Obligation Bonds.

The types of infrastructure projects that can be financed with COPs is limited because of the leasing concept.

Obstacles: A security interest is usually provided where possible. The ability to transfer or assign ownership of public property may be unclear or cumbersome.

Since COPs are structured in a similar manner to LTGOs in that they are often secured by the unrestricted funds of the issuer, they are subject to the same limitations as LTGOs.

Remedies: Legislate authority to enter into long-term leases without voter approval. Clarify ability to transfer ownership as needed for lease-purchase purposes. Permit the use of a non-substitution clause where it would further enhance the issue.

Taxable Bonds of Any Type

Jurisdictions Potentially Authorized: Municipalities, counties, and special districts.

Description: Taxable bonds can be issued for any purpose and be of any type listed earlier. The taxable bond option exists for an issuer if, for some reason, the infrastructure project under consideration cannot be financed with tax-exempt debt. This is most common where the project is deemed to be "private purpose" under federal arbitrage law and is not an "exempt purpose."

Obstacles: With the loss of the tax exemption on interest, the interest cost is substantially higher.

There is a relatively small market for taxable municipal bonds, especially of a small size.

Remedies: Well-secured taxable municipal bonds are an excellent investment opportunity for jurisdictions. The state may have to provide some secondary market assurances to provide the liquidity necessary to trade the bonds prior to maturity, or most bonds will be too long-term for investment.

ALTERNATIVE PRIVATIZATION TECHNIQUES—MORE LIKELIHOOD OF ACCEPTANCE

The term "privatization" is popular within the financial industry but has produced less favorable treatment in Congress, which has severely limited tax-exempt Industrial Development Revenue Bonds and sale-leasebacks through the recent succession of tax reform acts.

Privatization of debt is a means to enable taxable individuals or

corporations to realize tax benefits (investment tax credit, depreciation, business interest tax deductions, etc.) not available to public entities when financing public facilities. Presumably, the tax benefits would be sizable enough to lower the cost to the public body, exceeding the cost benefits of publicly issued tax-exempt financing. However, privatization is more commonly utilized not for cost savings, but for the purpose of:

- avoiding the issuance of debt to finance facilities, even if the cost is greater; or
- sharing risk, especially on technologically or financially riskier enterprises such as a resource recovery or solid waste facility.

Types of Privatization Techniques

True Leases or Vendor Leases

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: The private enterprise owns the facility and/or equipment and leases it to a public agency. The lease payment is usually set equal to the cost of paying for the facility or equipment plus a pre-determined rate of interest. The amount of the interest rate charged by the private body will be reflective of the riskiness of the project. A tax benefit to the private lessor with a lease arrangement is the depreciation which accrues.

However, these leases are not installment sales contracts (as are Certificates of Participation and Lease Purchase Bonds) and therefore do not have a tax-exempt interest component. If the municipality wishes to purchase the leased asset at the end of the lease, it must pay full market value.

Service or Operating Contracts

Jurisdictions Potentially Authorized: Municipalities and counties.

Description: In a true lease the public agency purchases the right to use a facility over a specified period of time. A service contract with the private entity simply pays the owner to manage and operate the facility. Private owners benefit from a service contract because they may be able to receive sizable tax benefits using Investment Tax Credits and accelerated depreciation.

Where the private entity constructs, owns, and operates a facility leased by a public agency, the contract is usually referred to as "full service."

Obstacles: Higher costs of capital for private entities entail higher costs for jurisdictions.

Remedies: Provide methods by which to lower front-end and/or capital costs for private financier. Some programs include tax abatement, land swaps or lease of public land, special utility or assessment rates, and the like. Land swaps or leases may require liberalization of some laws relating to the lease or sale of public property.

ADDITIONAL REVENUE-RAISING MECHANISMS THAT CAN BE EXPANDED OR CONSIDERED

TAX OPTIONS—MORE LIKELIHOOD OF ACCEPTANCE

Municipalities across the country have lessened their dependence on property taxes by making greater use of fees and by using other types of taxes. This section focuses on tax options. The three main types of non-property taxes that local governments can adopt are sales, income, and excise taxes.

Sales

Nationally, local option sales taxes are second only to property taxes in the amount of revenue raised for local governments. More than 5,000 cities and 1,200 counties levy a local sales tax, with rates usually between one and three percent. According to the 1992 Census of Governments, cities with a sales tax had average property tax rates 50 percent less than those without a sales tax. Sales tax revenue may be dedicated to special purposes, such as building infrastructure, or revenues may go into the general fund. Sales taxes may be levied for a specified period of time. Levying taxes at the county or regional level and distributing a share to cities on a per capita basis provides for efficient administration and reduces competition for retail activity. Most local sales taxes are collected along with a state sales tax. Although it is currently feasible to use local option sales taxes in South Carolina, few counties or municipalities do so.

Excise

Local excise taxes, or selected sales taxes, are more prevalent than local income taxes. Typical types are utility taxes, hotel-motel taxes, gas taxes, and "sin" taxes. Cities derive the most revenue from utility taxes, whereas counties rely mainly on "sin" taxes. South Carolina's cities and counties use these types of taxes only limitedly.

Local governments can impose excise taxes on a variety of other transactions. For example, some cities and counties in the state of Washington collect a real estate transfer tax with proceeds dedicated to capital projects. Many of these taxes are costly to administer and produce only minor amounts of revenue.

TAX OPTIONS—LESS LIKELIHOOD OF ACCEPTANCE

Income

Local income taxes are not as common as local sales taxes. They are used most often in larger cities nationally where they provide a way for cities to tax workers who reside in the suburbs. Cities that levy an income tax generally rely on it more than on the property tax. However, when single jurisdictions adopt income taxes they may become less attractive to businesses and residents than nearby jurisdictions without income taxes.

SPECIAL ASSESSMENTS—MORE LIKELIHOOD OF ACCEPTANCE

Transportation Development Districts

One concept growing in use is a package of state, local, and private funding for roads. These packages combine the traditional mix of state and local financing of roads with special assessment districts that raise money from those who most directly benefit from road improvements. Colorado, New Jersey, Pennsylvania, and Virginia have laws encouraging the formation of these districts in growth areas.

The districts are formed to provide public-private partnerships to pay for major road and interchange improvements necessitated by growth. For example, in New Jersey, transportation development districts may be formed in rapidly growing areas with projected traffic growth of 50 percent or more in five years. Substantial commercial/retail development is required as these establishments pay the bulk of the fees. New Jersey's fees are similar to impact fees. They are based on the amount of traffic a new development is expected to generate and can pay only for

additional capacity. Fees are collected when building permits are issued and must be spent on highway projects within ten years or refunded (New Jersey Transportation Development District Act of 1989). New Jersey developers supported the bill establishing Transportation Development Districts because it clarified the permissible fee structure for them.

SPECIAL ASSESSMENTS—LESS LIKELIHOOD OF ACCEPTANCE

Mello-Roos Community Facility Districts

California local governments have another option, the Mello-Roos Community Facility District, since the passage of enabling legislation in 1982. These districts can be used for various purposes and take many forms.

Mello-Roos districts are formed by cities, counties, special districts, or school districts to provide certain services or levy special taxes to finance public facilities. They may be as small as a subdivision or as large as an entire city. They are frequently formed at the request of developers to finance infrastructure in new developments. Mello-Roos districts can provide police, fire, recreation, library, and storm water services. They can be used to finance parks, schools, libraries, any other governmental facility, and also the installation of gas, telephone, and electric utility lines. Use of Mello-Roos bonds has risen from one issue of $8.5 million in 1983 to 58 issues totaling $751 million in 1989. Although most often used for non-school purposes, school construction use has been increasing, and in 1989 about one-third of the bond issues were for school buildings.

Unlike regular assessment districts, Mello-Roos districts do not have to be contiguous, and the assessments need not be based on benefits received. They do require a two-thirds vote of the affected residents if the area has twelve or more registered voters. If the district has fewer than twelve registered voters, the land owners are the voters.

There is considerable flexibility in establishing the Mello-Roos tax rate and formula. Different rates may apply to residential and commercial properties, new and old residents, developed and undeveloped land. For example, the City of Belmont, California, created the first city-wide Mello-Roos district in 1987 to finance a storm drainage system after a public outcry about a previously proposed system. Both ad valorem taxes and special assessment districts were rejected as means of financing the system because they did not meet politically acceptable criteria. With the Mello Roos district, two levels of tax were adopted—a base rate paid by all landowners in the city and a supplemental rate paid by landowners directly benefiting from the system. Different types of land uses were assessed at different rates based on flood-related claims against the city.

USER CHARGES AND FEES—MORE LIKELIHOOD OF ACCEPTANCE

Selling Access Rights

Escondido, California; Houston, Texas; and Upper Merion Township (King of Prussia area), Pennsylvania, have used the sale of access rights to finance sewage treatment plant construction. The charges are like impact fees paid in advance. Land owners and developers may buy guarantees that sewerage treatment will be available for their projects. Those who do not buy access rights may be denied service or will have to pay higher prices for access to the system. This prepayment of costs generates the funds to build the needed treatment facilities. The jurisdictions have different rules about whether the access rights can be sold on the open market or must be sold back to the jurisdiction if no longer wanted.

Toll Roads

Toll roads, once a common form of financing in eastern states, are returning. A toll road is being built in Virginia from Dulles Airport to Leesburg, two are being discussed in Colorado, and the U.S. Department of Transportation is encouraging greater use of this mechanism. Toll roads are another mechanism for charging users directly but are often objectionable to a society accustomed to "free ways."

USER CHARGES AND FEES—LESS LIKELIHOOD OF ACCEPTANCE

Congestion Pricing

According to economic theory, road users would make more efficient use of roads if they paid the full cost of road use. Under current pricing policies, a driver who uses roads at peak periods pays only the personal cost of going slower and not the social cost of slowing down everyone else. If drivers were charged for the congestion they cause, some would shift their trips to less costly driving times. Toll roads could readily collect congestion charges by having higher tolls during peak periods. Collecting congestion charges without toll roads is technologically possible but fraught with administrative and political problems.

EXPANDED AND MORE INNOVATIVE USE OF EXISTING REVENUE-RAISING MECHANISMS

Although jurisdictions in South Carolina use special assessments, their use is often restricted to upgrading developed areas where they finance projects such as sewer installations or road improvements. Tacoma, Washington, uses special assessments to help developers finance the required infrastructure for their developments. Developers use special assessments if they can obtain cheaper financing than they can obtain directly.

Special Assessments for Arterial Streets

Another potential use of special assessments is to help finance arterial street improvements necessitated by growth. The city of Bellevue, Washington, did this for 25 years. Theoretically, commercial land owners benefit from street improvements because the value of their property increases. Commercial property owners, however, complained that they received no direct, immediate benefits from the improvements they paid for and were beginning to refuse to form special assessment districts. Bellevue now uses a variety of taxes and fees to finance street improvements, including a 1/2 cent local sales tax dedicated to capital improvements, a wage tax, impact fees, and the city's portions of the county vehicle registration charge and state gas tax.

This case study illustrates that using special assessments for major streets has problems. Creating transportation development districts, which were discussed earlier, may be one way to deal with some of the issues.

Storm Water and Street Utilities

Another concept that is gaining acceptance is the storm water and street utility. Water and sewer departments were the first to be treated as utilities. Utilities are permanent organizations that operate and maintain specific public works and raise revenues from user charges. Utilities insulate public works from the uncertainties of general revenue budgeting, tie costs to benefits received, and sometimes collect fees from tax-exempt properties.

Fort Collins, Colorado, has had a storm water utility since 1981 and a street utility since 1984. Both charge new development a connection fee and all users a monthly use fee along with their water and sewer bills. Storm water charges are based on the amount of

runoff expected and the cost of operating the utility in that drainage. Street utility fees are based on the amount of traffic a building generates and its street frontage.

EXTENDING FEES TO NEW DEVELOPMENT

South Carolina's local governments could use a variety of mechanisms to finance the infrastructure needed to service new growth. This section describes a variety of mechanisms that raise funds for infrastructure from new development.

Washington County's Traffic Impact Fee (The Oregon Experience)

In 1986 Washington County, Oregon, adopted a Traffic Impact Fee (TIF) to pay partially for the extra capacity needed on arterials and major collectors because of new growth. The fee replaced previous county systems development charges and was collected only in the unincorporated areas of the county. In September 1990 Washington County voters approved a new ordinance providing for the uniform collection of TIFs throughout the county.

The fees charged depend on the type of new development and the number of trips it generates. Rates per weekday trip for each type of use are specified in the ordinance. These rates may increase up to 6 percent per year. The Institute of Traffic Engineers standards are used to determine the number of trips a use generates. For example, the current fee for single-family residences is $1,350 ($135 times 10.0 average trips); for business and commercial buildings it is $34 times the average number of weekday trips for the type and size of place.

In 1988 road impact fees in the United States ranged from $130 to $4,271 per single-family house with a mean of $946 and median of $804. Washington County's TIF is therefore slightly above average. Nonetheless, the County estimates that the fee generates only about one-fourth of the revenue needed to add new transportation capacity due to growth.

TIF proceeds are used to fund off-site improvements on county and city roads and for transit capacity improvements. TIF money can be used only to add capacity, not to bring roads up to standards. Other funding sources must be used to solve existing needs. All revenue collected within any jurisdiction must be spent within that jurisdiction or on projects that directly benefit that jurisdiction. A base report lists the arterials and major collectors that are eligible for TIF funding and prioritizes projects on these streets within each jurisdiction.

The new TIF involves a high degree of city-county cooperation. Countywide application eliminates inequalities in payments based on jurisdiction, provided cities do not charge additional systems development charges for roads. Funds go to the jurisdiction in which they are collected.

Storm Sewer Utility Fees

The Unified Sewerage Agency of Washington County assumed responsibility for surface water management in the Tualatin River Basin in July 1990, becoming the storm water as well as the sewer utility for that area. It is using service charges and connection fees to finance this function. In FY 94-95 the agency collected $5,540,000 in surface water service charges and $1,950,000 in surface water connection fees.

Fees for individual properties are $3.00 per Equivalent Service Unit (E.S.U.) per month, where one E.S.U. is the average amount of impervious area of a single-family home. All other developments, ranging from apartment buildings to an airport, were assigned a number of E.S.U.s by measuring their impervious area on aerial photos. New development

pays a connection fee of $375 per E.S.U. because it adds to the load that must be served by storm sewers. Adjustments to the connection charge may be made for large developments depending on the drainage provided within the development.

Street Utility Fees

Several cities in Oregon now charge street utility fees along with water and sewer bills. Ashland has had a fee since 1986; Tualatin adopted one in 1990; and Medford is currently considering one. Tualatin's fee will raise about $350,000 annually for preventive maintenance of streets and street lighting. Fees are based on the amount of traffic generated by each use according to the Institute of Transportation Engineers standards. These standards consider type of use and size of building. Single-family homes pay $1.42 on their monthly utility bill, whereas large traffic generators like fast food restaurants pay $72.73 per 1,000 square foot of space.

CONCLUSION

The menu of revenues presented here represents potential alternatives that can be considered to raise revenues for, or to finance, infrastructure. In the next part of this report, primary revenues will be fit to various categories of infrastructure need to determine the ability to satisfy this need.

PART B-REVENUE PROJECTIONS

This portion of the report deals with revenue projections as they relate to infrastructure need. Calculations contained here reflect what has been done in other states to raise money for infrastructure purposes. While these revenue-raising mechanisms certainly apply in South Carolina, it should be realized that only one alternative is being shown here—full funding of infrastructure need. Other possibilities that exist are partial funding of infrastructure or funding infrastructure via different methods. It is evident from this exercise that infrastructure need is large, and a variety of sources must be tapped to raise revenues to meet this need. Revenue-raising requirements are based on a $40 billion infrastructure need after all potential savings have been taken into account. The next section begins with a discussion of issues surrounding the revenue projections that ultimately follow.

ISSUES IN REVENUE PROJECTION

Annualization

One way to approach a $40 billion infrastructure bill over a 20-year period is to express the infrastructure amount in billions per year. In this case, it is an average of $2 billion per year for twenty years. Obviously, the actual infrastructure amount will be more or less at any point in time, but over the 20-year period, it will average approximately $2 billion annually. The mid-period year 2005 is used as the state/local infrastructure demand and revenue supply year.

Financing

Because infrastructure costs may be held over from a prior period and occur, in addition, in a subsequent period, an initial assumption of this analysis is that no infrastructure need occurs from or is transmitted to another period. In other words, no infrastructure is financed or paid for in any other way in another period. Infrastructure is paid for from current funding with no fiscal obligations extending from the prior period and no fiscal obligations extending into the future. This allows funding reservations from mid-period-level (2005) state and local (county, municipal, and school district) budgets to address average infrastructure need. Mid-period-level revenues are assumed to be the average amount of revenues

delivered over the period reflecting 2005 conditions.

Current Dedications of Revenues

Current dedications of infrastructure resources is the amount of money from 2005 mid-period-level state and local budgets dedicated for infrastructure purposes. A percentage is applied to total revenues from these revenue sources at this time period to determine the share of funds allocated to infrastructure. This percentage—10 percent applied to state and local revenues—comes from current amounts assigned to infrastructure purchases and finance in these budgets. Not all current sources of state and local revenue are assumed to have a share dedicated for infrastructure. Only slightly over 60 percent of general fund revenues have a share of their revenues designated for infrastructure support purposes.

New Increases in Revenues

New increases in revenues represent the amounts that are raised to cover the average or mid-period infrastructure funding gap. Funding selections are made at both state and local governmental levels and involve revenues that are likely candidates to fund infrastructure. Again, only one scenario is shown here—that is, the full funding of infrastructure. As indicated previously, a partial revenue increase could be opted for, or other sources of revenue identified.

Multiple and Individual Revenues

If a grouping of revenues is used for current dedication, for instance general fund revenues at the state or local level, and an individual component of these revenues is selected to be projected separately to increase, all grouped revenues are used for current dedications and the specific revenue selected for increase is projected separately.

The Array of Revenues

Revenues emerge from two basic groups: *current budget dedications* and *necessary revenue increases* for both state and local governments. The first category, *budget dedications*, involves state and local general fund revenues as well as intergovernmental transfers. The second category, *revenue increases*, applies to several categories of state and local revenues: sales tax, user charges, gasoline tax, and the property tax (local revenues only).

State and Local Sources of Infrastructure Revenue

Current Budget Dedications State/Local

(1) General Fund Revenues
(2) Intergovernmental Transfers

Revenue Increases

(1) Sales Tax
(2) User Charges
(3) Property Tax

PROJECTING INFRASTRUCTURE REVENUES

The general methodology for revenue projections is to obtain revenue information for 1995 as the base year. Based on population, household, and employment projections developed by Rutgers' Center for Urban Policy Research (CUPR), each revenue is converted to a per capita, per household, or per job amount (depending on the type of revenue) for a given year. These values per unit are multiplied by future projections to obtain revenue amounts for both 2005 and 2015. Values for 2000 and 2010 are interpolated from midpoints of the 1995–2005 and 2005–2015 projections. All revenues are in 1995 dollars; inflation is assumed to be equal on the cost *(infrastructure need)* and revenue *(infrastructure funding)* sides of the equation.

Current Budget Dedications

State General Fund Revenues (Table 1)

State revenues for FY 1994-1995 are obtained from the summary of revenues of the South Carolina Department of Revenue. Future values for the gasoline tax allocated to counties, the gasoline tax for state uses, and the local option sales tax are taken from Tables 4 and 5 (see below). The phasing out of the soft drink tax is based upon information contained in the South Carolina Governor's Executive Budget for FY 1997-1998. Projections for the other line items are based on 1995 per capita or per employee revenues multiplied by the population and employment projections of Report #1 of this study. It is determined that of the 62 percent future growth in revenues, a share can be tapped for capital expenditures. Ten percent of this figure is allocated specifically toward the $2 billion annual funding requirement for new infrastructure need and maintenance. The 62 percent specification acknowledges that not all revenues can have a component dedicated to fund capital projects; the 10 percent figure specified is reasonable for a responsible capital facilities program.

State general fund revenues are projected using 1995 as the budget year base. As of 1995, the state of South Carolina general fund budget was $4.69 billion. This consisted of revenues such as the personal and business income tax, business and corporate license tax, state sales tax, gasoline tax, drivers license fees, and others. The revenue sources will average $5.26 billion for the period 1995-2015 (2005 is used as the average or mid-period). Assuming that about 62.5% of these revenues have a share dedicated for infrastructure, i.e., $3.3 billion, with a 10 percent dedication of general fund revenues, this amounts to $0.33 billion annually for infrastructure purposes.

Local General Fund Revenues (Table 2)

Total county and municipal revenues for the state for 1995 are obtained from computer printouts provided by individual regional councils of government. These sources provide only aggregate county and municipal costs and revenues. More specific breakdowns for county service charges are obtained from 1994 Annual County Financial Reports for South Carolina. Values for sewer and water fees, parking facility charges, and development impact fees for 1994 are projected to the 1995 base using growth in population, households, and jobs. All future revenues for county and municipal sources are based on multiplying future projections for population, households, and jobs by their 1995 per capita values.

For school district revenues, 1995 revenue information for current property tax and other local government revenues comes from the South Carolina Department of Education's *Financial Report, 1994–1995*. Future values for the current property tax are taken from Table 8 (see below). Revenues from other local governments are projected into the future on a per capita basis. Other sources of school district revenue are estimated as 10% of the value for current property tax.

It was previously determined that a share of the 62.5 percent of revenues could be dedicated to capital purposes. Ten percent of this amount was allocated specifically toward the $2 billion annual funding required for future infrastructure growth and maintenance.

Local general fund revenues of counties, municipalities, and school districts amount to $3.11 billion as of 1995. Average general fund revenues for the period 1995 to 2015 are $3.52 billion (2005 or mid-period figure). Again, only 62.5% of these revenues is used to

TABLE 1
CURRENT STATE BUDGET DEDICATIONS: GENERAL FUND AND OTHER REVENUES

Variable	1995 Existing Conditions	2005 Trend Extended Conditions	1995-2005 Difference	1995-2005 % Annual Growth
Regular Sources				
Sales & Use Tax	$1,427,058,377	$1,589,940,934	$162,882,557	1.1%
Casual Excise Tax	$13,153,298	$14,654,598	$1,501,300	1.1%
Individual Income Tax	$1,658,439,985	$1,847,732,133	$189,292,148	1.1%
Corporate Income Tax	$229,786,380	$264,088,501	$34,302,121	1.5%
Subtotal	$3,328,438,040	$3,716,416,166	$387,978,126	1.2%
Other Revenue				
Gasoline Tax (Allocated to Counties)	$61,058,026	$74,419,013	$13,360,987	2.2%
Business License Tax	$30,070,289	$34,559,131	$4,488,842	1.5%
Corporate License Tax	$ 45,543,778	$52,342,476	$6,798,698	1.5%
Motor Vehicle Licenses	$96,930,875	$107,994,437	$11,063,562	1.1%
Soft Drinks Tax*	$25,575,484	$12,787,742	$(12,787,742)	-5.0%
Other	$223,127,983	$248,595,516	$25,467,533	1.1%
Subtotal	$482,306,435	$530,698,314	$48,391,879	1.0%
General Fund Revenue				
Education Improvement Fund	$359,725,666	$400,784,278	$41,058,612	1.1%
Gasoline Tax (Allocated for State Uses)	$323,423,906	$394,196,953	$70,773,047	2.2%
Local Option Sales Tax	$64,542,483	$71,909,277	$7,366,794	1.1%
Other	$131,793,574	$146,836,319	$15,042,744	1.1%
Subtotal	$879,485,629	$1,013,726,826	$134,241,197	1.5%
Grand Total	$4,690,230,104	$5,260,841,307	$570,611,203	1.2%

* Soft drink tax to be repealed by 2001.

Year	Summary of Annual Revenues		62.5% for Infrastructure (Billions)	10% Allocation (Billions)
	In Dollars	In Billions		
1995	$4,690,230,104	$4.69	$2.93	$0.293
2000	$4,975,535,705	$4.98	$3.11	$0.311
2005	$5,260,841,307	$5.26	$3.29	$0.329
2010	$5,546,146,908	$5.55	$3.47	$0.347
2015	$ 5,831,452,509	$5.83	$3.64	$0.364

Sources: State of South Carolina Department of Revenue, "Tax Collections for 1994-1995"; SEA, Inc.

TABLE 2
CURRENT COUNTY/MUNICIPAL/SCHOOL DISTRICT BUDGET DEDICATIONS: GENERAL FUND AND OTHER REVENUES

Variable	1995 Existing Conditions	2005 Trend Extended Conditions	1995-2005 Difference	% Annual Growth
County Sources				
Locally Generated				
Current Property Tax	$512,477,471	$581,215,563	$68,738,091	0.7%
Local Option Sales Tax	$33,879,005	$59,574,787	$25,695,782	3.8%
Licenses and Permits	$35,744,344	$41,080,199	$5,335,855	0.7%
Service Charges				
Sewer & Water	$5,516,797	$6,146,477	$629,680	0.6%
Parking Facilities	$65,353,060	$72,812,372	$7,459,312	0.6%
Development Impact Fees	$25,027,109	$28,328,823	$3,301,714	0.7%
Other	$134,939,005	$150,340,765	$15,401,760	0.6%
Subtotal Service Charges	$230,835,971	$257,628,437	$26,792,466	0.6%
Miscellaneous	$53,475,174	$59,578,760	$6,103,586	0.6%
Subtotal	$866,411,965	$988,291,538	$121,879,572	0.7%
Intergovernmental				
Federal	N/I	N/I	N/I	N/I
State	N/I	N/I	N/I	N/I
Other Local Governments	$15,973,400	$17,796,583	$1,823,183	0.6%
Subtotal	$15,973,400	$17,796,583	$1,823,183	0.6%
Total County	$882,385,365	$1,006,088,120	$123,702,755	0.7%
Municipal Sources				
Locally Generated				
Current Property Tax	$238,632,687	$265,869,906	$27,237,219	0.6%
Local Option Sales Tax	$21,621,474	$24,089,320	$2,467,846	0.6%
Licenses and Permits	$150,311,651	$172,749,919	$22,438,268	0.7%
Service Charges	$100,758,830	$112,259,310	$11,500,480	0.6%
Miscellaneous	$46,964,362	$52,324,812	$5,360,450	0.6%
Subtotal	$558,289,004	$627,293,268	$69,004,264	0.6%
Intergovernmental				
Federal	N/I	N/I	N/I	N/I
State	N/I	N/I	N/I	N/I
Other Local Governments	$18,128,296	$20,197,436	$2,069,140	0.6%
Subtotal	$18,128,296	$20,197,436	$2,069,140	0.6%
Total Municipal	$576,417,300	$647,490,704	$71,073,404	0.6%
School District Sources				
Locally Generated				
Current Property Tax	$1,503,892,995	$1,704,144,220	$200,251,225	0.7%
Other Sources	$150,389,299	$170,414,422	$20,025,122	0.7%
Intergovernmental				
Other Local Governments	$353,000	$393,291	$40,291	0.6%
Total School District	$1,654,635,294	$1,874,951,932	$220,316,638	0.7%
Grand Total	$3,113,437,959	$3,528,530,757	$415,092,797	0.7%

	Summary of Annual Revenues			
Year	In Dollars	In Billions	62.5% for Infrastructure (Billions)	10% Allocation (Billions)
1995	$3,113,437,959	$3.113	$1.946	$0.195
2000	$3,320,984,378	$3.321	$2.076	$0.208
2005	$3,528,530,757	$3.529	$2.205	$0.221
2010	$3,736,077,214	$3.736	$2.335	$0.234
2015	$ 3,943,623,632	$3.944	$2.465	$0.246

Notes: NI=Not Included. Revenues generated in a separate table.
Sources: State of South Carolina Department of Revenue, County and Municipal Revenues; SEA, Inc.

support infrastructure. Sixty-two and one-half percent of $3.52 billion amounts to $2.21 billion. At 10 percent reservation for capital facilities, this is $221 million, or $0.221 billion for infrastructure purposes.

State and Local Intergovernmental Transfers (Table 3)

State

Federal funds transferred to state and funds earmarked for state were obtained from the South Carolina *State Budget Recapitulation (Section 70)*, which is accessed through the Internet.

State and local intergovernmental transfers consist of federal to state, state to local, and federal to local revenue disbursements. State and local government infrastructure projections are limited by the amounts that actually flow to these jurisdictions annually. In the case of state intergovernmental transfers, revenues consist of unrestricted federal transfers ($3.45 billion-1995) and federally earmarked transfers ($2.30 billion-1995). These revenues amount to $3.85 billion and $2.57 billion, respectively, in 2005. At 10 percent and 5 percent reservation levels for capital purposes, unrestricted and earmarked federal transfers in year 2005 provide $0.385 and $0.128 billion respectively, or a total of $0.513 billion for infrastructure purposes.

Local

1995 state totals of funds transferred to counties and municipalities are taken from computer printouts provided by regional councils of government (COGs). Funds transferred to school districts are obtained from the South Carolina Department of Education's *Financial Report, 1994–1995*. All values are projected into the future on a per capita basis.

For local governments, federal and state transfers to counties and municipalities amounted to $270 million in 1995 and will grow to $306 million in 2005. Federal and state transfers to school districts amounted to $3.30 billion in 1995 and will grow to $3.68 billion in 2005. With county and municipal intergovernmental transfers, they amount to $3.98 billion in 2005. With 10 percent reservation for capital funding this produces $0.398 billion for infrastructure purposes.

Increases in Existing Revenues

Sales Tax Increase (Table 4)

State

The state sales tax in South Carolina is currently 5.0 percent. Most items, including food, are subject to this tax. Revenue for the 1995 state sales tax is taken from *FY 1994–1995 Summary of Revenues* provided by the South Carolina Department of Revenue. These figures are divided by the 5% state sales tax to obtain annual sales volume. Per capita sales volume is then projected annually into the future. Future revenues are based on either a 5% tax (trend extended) or a 5.5% tax (reflecting the increase). All of the state sales tax increase is considered to be available for infrastructure funding (primarily educational).

The state sales tax produced about $1.43 billion in state revenues in 1995. This will increase to $1.59 billion by the mid-point year 2005. If the state sales tax is increased by one-half point or 10 percent, it will yield $159 million more in revenues or $0.159 billion. All of this increase is earmarked for educational infrastructure need purposes.

Local

The local option sales tax currently is used in 25 counties in South Carolina. County local option sales tax revenues, including per capita amounts, are obtained for each county for 1995 from computer printouts supplied by the regional councils of government. These

TABLE 3
CURRENT BUDGET DEDICATIONS:
STATE AND LOCAL INTERGOVERNMENTAL TRANSFERS

Variable	1995 Existing Conditions	2005 Trend Extended Conditions	1995-2005 Difference	1995-2005 % Annual Growth
Population	3,684,715	4,105,284	420,569	1.1%
Funds Transferred to State				
Federal Transfers to State	$3,454,733,320	$3,849,052,015	$394,318,695	1.1%
Per capita	938	938	-	0.0%
Earmarked Funds for State	$2,303,192,242	$2,566,075,560	$262,883,318	1.1%
Per capita	$625	$625	-	0.0%
Funds Transferred to Counties				
Federal Transfers to Counties	$51,837,504	$57,754,168	$5,916,664	1.1%
Per capita	$14	$14	-	0.0%
State Transfers to Counties	$218,566,288	$243,513,155	$24,946,867	1.1%
Per capita	$59	$59	-	0.0%
Funds Transferred to Municipalities				
Federal funds received	$47,050,380	$52,420,648	$5,370,268	1.1%
Per capita	$13	$13	-	0.0%
State funds received	$56,036,466	$62,432,394	$6,395,928	1.1%
Per capita	$15	$15	-	0.0%
Funds Transferred to School Districts				
Federal funds received	$296,825,645	$330,704,932	$33,879,287	1.1%
Per capita	$81	$81	-	0.0%
State funds received	$1,503,775,369	$1,675,414,302	$171,638,933	1.1%
Per capita	$408	$408	-	0.0%

	Summary of Intergovernmental Transfers to State		Total	5 to 10% Allocation
Year	Federal	Earmarked	(Billions)	(Billions)
1995	$3,454,733,320	$2,303,192,242	$5.76	$0.461
2000	$3,651,892,668	$2,434,633,901	$6.09	$0.487
2005	$3,849,052,015	$2,566,075,560	$6.42	$0.513
2010	$4,046,211,363	$2,697,517,220	$6.74	$0.539
2015	$4,243,370,710	$2,828,958,879	$7.07	$0.566

	Summary of Intergovernmental Transfers to Counties and Municipalities		Total	10% Allocation
Year	Federal	State	(Billions)	(Billions)
1995	$51,837,504	$218,566,288	$0.27	$0.027
2000	$54,795,836	$231,039,722	$0.29	$0.029
2005	$57,754,168	$243,513,155	$0.30	$0.030
2010	$60,712,500	$255,986,589	$0.32	$0.032
2015	$63,670,832	$268,460,022	$0.33	$0.033

	Summary of Intergovernmental Transfers to School Districts		Total	10% Allocation
Year	Federal	State	(Billions)	(Billions)
1995	$1,800,601,014	$1,503,775,369	$3.30	$0.330
2000	$1,903,360,124	$1,589,594,836	$3.49	$0.349
2005	$2,006,119,234	$1,675,414,302	$3.68	$0.368
2010	$2,108,878,344	$1,761,233,769	$3.87	$0.387
2015	$2,211,637,454	$1,847,053,235	$4.06	$0.406

Sources: State of South Carolina, State and Local Budgets, 1995; Sandstone Environmental Associates, Inc.

TABLE 4
REVENUE INCREASES—SALES TAX

Variable	1995 Existing Conditions	2005 Trend Extended Conditions	2005-1995 Difference	Modified 2005 Conditions	2005-1995 Difference
State Sales Tax					
Population	3,684,715	4,105,284	420,569	4,105,284	$420,569
Rate	5.0%	5.0%	-	5.5%	$0
Revenues	$1,427,058,377	$1,589,940,934	$162,882,557	$1,748,935,027	$321,876,650
Per capita revenues	$387	$387	-	$426	$39
Sales Volume	$28,541,167,540	$31,798,818,680	$3,257,651,140	$31,798,818,680	$3,257,651,140
Per capita sales	$7,746	$7,746	-	$7,746	$-
County Local Option Sales Tax					
Population Taxed	736,900	1,509,700	772,800	4,105,284	$3,368,384
Revenues	$33,879,005	$59,574,787	25,695,782	$123,009,387	$89,130,382
Per capita revenues	$45.98	$39.46	(7)	$29.96	$(16)
Sales Volume	$28,541,167,540	$31,798,818,680	$3,257,651,140	$31,798,818,680	$3,257,651,140
Per capita sales	$7,746	$7,746	-	$7,746	$-
City Local Option Sales Tax					
Revenues	$21,621,474	$38,020,441	$16,398,967	$78,504,202	$56,882,728
% of county revenues	63.8%	63.8%	-	63.8%	-

Year	Sales Volume	Summary of Annual State Sales Tax Revenues		Difference (In Billions)	100% Allocation
		Trend Extended	Tax Increase		
1995	28,541,167,540	$1,427,058,377	$1,569,764,215	$0.143	$0.143
2000	30,169,993,110	$1,508,499,656	$1,659,349,621	$0.151	$0.151
2005	31,798,818,680	$1,589,940,934	$1,748,935,027	$0.159	$0.159
2010	33,427,644,250	$1,671,382,213	$1,838,520,434	$0.167	$0.167
2015	35,056,469,820	$1,752,823,491	$1,928,105,840	$0.175	$0.175

Year	Summary of Annual County Local Option Sales Tax Revenues		Difference (Billions)	29% Allocated to Infrastructure (Billions)
	Trend Extended	Tax Expansion		
1995	$33,879,005	$110,407,595	$0.077	$0.022
2000	$57,513,115	$116,902,024	$0.059	$0.017
2005	$59,574,787	$123,009,387	$0.063	$0.018
2010	$61,636,460	$129,116,749	$0.067	$0.020
2015	$63,698,132	$135,224,111	$0.072	$0.021

Year	Summary of Annual Municipal Option Sales Tax Revenues		Difference (Billions)	29% Allocated to Infrastructure (Billions)
	Trend Extended	Tax Expansion		
1995	$21,621,474	$70,461,778	$0.049	$0.014
2000	$36,704,688	$74,606,503	$0.038	$0.011
2005	$38,020,441	$78,504,202	$0.040	$0.012
2010	$39,336,194	$82,401,901	$0.043	$0.012
2015	$40,651,947	$86,299,601	$0.046	$0.013

Sources: State of South Carolina, State and Local Revenues, 1995; Sandstone Environmental Associates, Inc.

are combined with county population projections to develop projections of future county revenues. State totals for current revenues extended to the mid-period year 2005 and the increase in the local option sales tax are based on the assumption that all counties will have a local option sales tax soon after 1995. Where no per capita value is available for projecting revenues for the additional counties, a value of $25 per capita is used, as this reflects a mid-range value based on review of other counties' per capita receipts. Twenty-nine percent of the revenue growth created by extending the local option sales tax to all counties is considered to be available for infrastructure purposes.

This percentage allocation is governed by current state law, which requires most of the revenues collected from this source to be devoted to reducing the property tax. The local option sales tax yielded $33.9 million in revenues as of 1995. It will increase to $59.6 million by the mid- or average-projection year (2005). If this sales tax is expanded to the remaining 21 counties, at the same rate, the revenue yield will increase to $123 million or an additional $63 million. This will produce about $18 million for infrastructure purposes because, again, only 29 percent of this revenue can be used for infrastructure purposes. The amount for revenue finance from this source is $.018 billion.

Gasoline Tax Revenues (Table 5)

State

The state gasoline tax at 16.75 cents per gallon currently yields $323 million in state revenues. By 2005, it will yield $394 million. If this tax is increased by 1 cent or 6 percent, revenues in 2005 will increase by $28 million. All of the $28 million increase will be used to fund *local* infrastructure. This amounts to $0.028 billion in the average year passed to counties and municipalities.

Local

A local gasoline tax does not exist currently in South Carolina. If an increase in the state gasoline tax is passed directly to counties in the amount of 1 cent across the board, this would produce $28 million in annual infrastructure revenues, or $.028 billion.

User Charges (Tables 6–7)

User charges consist of fees paid for services or capital items. In the former case, they take the form of tolls (at the state level) and water/sewer fees (at the local level); for the latter purpose, in the form of impact fees primarily at the local level.

State: Tolls on Interstates (Table 6)

Currently there are no tolls on any roads in South Carolina. If tolls are added to major interstates with full dedication for transportation infrastructure purposes, significant capital funds could be garnered.

Vehicle miles traveled (VMT) for 1995 and 2015 is obtained from the South Carolina Department of Transportation. An estimate of 10% is used to derive the share of VMT on tolled interstates for 1995 and future years. Assuming that drivers have an average trip length of 20 miles, an estimate of 193.6 million toll road trips is derived by dividing toll road VMT by average trip length. Future revenues were calculated by assuming that *EZ Pass* collection systems would be 20 miles apart, and that drivers would be assessed $0.25 at each EZ Pass monitoring point. This is a conservative approach to projecting revenues, since all vehicles are assumed to be passenger vehicles. Toll roads typically charge higher tolls for trucks, which may consume as much as one-third of the vehicle miles traveled. All new revenues are allocated for infrastructure purposes. Total VMT in the state as of 1995 is about 38 billion. By 2005, it will be 51 billion. Trips on

TABLE 5
REVENUE INCREASES—GASOLINE TAX

Variable	1995 Existing Conditions	2005 Trend Extended	1995-2005 Difference	2005 Tax Increase	1995-2005 Tax Increase Difference
Households	1,330,368	1,482,838	152,470	1,482,838	152,470
Drivers/Household	2.8	2.8	-	3	-
Drivers Licenses	3,763,990	4,195,371	431,381	4,195,371	431,381
Registered Vehicles	2,852,990	3,179,964	326,974	3,179,964	326,974
Vehicles/Household	2.1	2.1	-	2.1	-
VMT	38,723,000,000	50,711,500,000	11,988,500,000	50,711,500,000	11,988,500,000
Annual Miles/Vehicle	13,573	15,726	2,153	15,726	2,153
1995 State Share of Gasoline Tax	$0.1409	$0.1409	-	$0.1409	$-
1995 Gallons/Year	2,295,414,519	2,797,707,260	502,292,740	2,797,707,260	502,292,740
1995 MPG	17	18	1	18	1
1995 Gas Tax Revenues to State	$323,423,906	$394,196,953	$9,715,021	$394,196,953	$9,715,021
County Share of Gas Tax	$0.0266	$0.0266	-	$0.03660	$0.010
1995 Gas Tax Revenues to Counties	$61,058,026	$74,419,013	$13,360,987	$102,396,086	$41,338,059
Total Gasoline Tax	$0.1675	$0.1675	$-	$0.1775	$0.0100
Total Gasoline Tax Revenues	$384,481,932	$468,615,966	$23,076,008	$496,593,039	$51,053,080

Year	Gallons	Summary of Annual State Gas Tax Revenues			
		Trend Extended	Tax Increase	Difference (Billions)	to Infrastructure (Billions)
1995	2,295,414,519	$323,423,906	$323,423,906	$-	$-
2000	2,546,560,890	$358,810,429	$358,810,429	$-	$-
2005	2,797,707,260	$394,196,953	$394,196,953	$-	$-
2010	3,048,853,630	$429,583,476	$429,583,476	$-	$-
2015	3,300,000,000	$464,970,000	$464,970,000	$-	$-

Year	Gallons	Summary of Annual County Gas Tax Revenues			
		Trend Extended	Tax Increase	Difference (Billions)	to Infrastructure (Billions)
1995	2,295,414,519	$61,058,026	$84,012,171	$0.023	$0.023
2000	2,546,560,890	$67,738,520	$93,204,129	$0.025	$0.025
2005	2,797,707,260	$74,419,013	$102,396,086	$0.028	$0.028
2010	3,048,853,630	$81,099,507	$111,588,043	$0.030	$0.030
2015	3,300,000,000	$87,780,000	$120,780,000	$0.033	$0.033

Sources: State of South Carolina Department of Revenue, Department of Transportation, and Division of Motor Vehicles; SEA, Inc.

TABLE 6
REVENUE INCREASES—STATE USER CHARGES

Variable	1995 Existing Conditions	2005 Trend Extended Conditions	1995-2005 Difference	2005 Increased Tax Conditions	1995-2005 Difference
Toll Roads					
VMT	38,723,000,000	50,711,500,000	11,988,500,000	50,711,500,000	11,988,500,000
% on Toll roads	10%	10%	-	10%	-
Toll road VMT	3,872,300,000	5,071,150,000	1,198,850,000	5,071,150,000	1,198,850,000
Avg. trip length	20	20	-	20	-
Number of trips	193,615,000	253,557,500	59,942,500	253,557,500	59,942,500
Avg. toll/trip	-	-	-	$0.25	0
Annual Revenues	$-	$-	$-	$63,389,375.00	63,389,375

Year	Vehicular Trips on Toll Roads	Summary of Annual State Toll Road Revenues		Difference (Billions)	100% Allocation to Infrastructure (Billions)
		Trend Extended	Toll Increase		
1995	193,615,000	$-	$48,403,750	$0.048	$0.048
2000	223,586,250	$-	$55,896,563	$0.056	$0.056
2005	253,557,500	$-	$63,389,375	$0.063	$0.063
2010	283,528,750	$-	$70,882,188	$0.071	$0.071
2015	313,500,000	$-	$78,375,000	$0.078	$0.078

Sources: State of South Carolina Department of Transportation and Department of Revenue; SEA, Inc.

TABLE 7
REVENUE INCREASES—COUNTY AND MUNICIPALITY USER CHARGES

Variable	1995 Existing Conditions	2005 Trend Extended Conditions	1995-2005 Difference	Modified 2005 Conditions	1995-2005 Difference
Households	1,330,368	1,482,838	152,470	1,482,838	152,470
Jobs	1,609,678	1,849,968	240,290	1,849,968	240,290
Development Impact Fees					
	15,168	15,247	79	15,247	79
Annual household increase	$8,198,732	$8,241,434	$42,702	$30,494,000	$222,295,268
Residential revenues	$541	$541	-	$2,000	$1,459
Avg. fee/new household	$16,828,376	$23,389,103	$6,560,727	$29,396,353	$12,567,977
Nonresidential revenues	17,289	24,029	6,740	24,029	6,740
Annual job increase	4,322,195	6,007,250	1,685,055	6,007,250	1,685,055
Annual square footage increase	$3.89	$3.89	$-	$4.89	$1.00
Avg. fee/sq.foot	$25,027,109	$31,630,537	$6,603,429	$59,890,353	$34,863,245
Total impact fee revenues	$239,466,240	$266,910,840	$27,444,600	$306,947,466	$40,036,626
Water & Sewer Fees					
1995 Revenues	$239,466,240	$266,910,840	$27,444,600	$306,947,466	$40,036,626
Average revenues/household	$180	$180	$-	$207	$27
Fee increase				15.0%	15.0%

Year	New Households	Summary of Annual Residential Development Impact Fee Revenues			100% Allocation to Infrastructure (Billions)
		Trend Extended	Fee Increase	Difference (Billions)	
1995	15,168	$8,198,732	$8,198,732	$-	$-
2000	15,247	$8,241,434	$30,494,000	$0.022	$0.022
2005	15,247	$8,241,434	$30,494,000	$0.022	$0.022
2010	15,247	$8,241,434	$30,494,000	$0.022	$0.022
2015	15,247	$8,241,434	$30,494,000	$0.022	$0.022

Year	New Square Feet of Development	Summary of Annual Nonresidential Development Impact Fee Revenues			100% Allocation to Infrastructure (Billions)
		Trend Extended	Fee Increase	Difference (Billions)	
1995	4,322,195	$16,828,376	$21,150,571	$0.004	$0.004
2000	6,007,250	$23,389,103	$29,396,353	$0.006	$0.006
2005	6,007,250	$23,389,103	$29,396,353	$0.006	$0.006
2010	6,007,250	$23,389,103	$29,396,353	$0.006	$0.006
2015	6,007,250	$23,389,103	$29,396,353	$0.006	$0.006

Year	Total Households	Summary of Annual Water & Sewer Fee Revenues			100% Allocation to Infrastructure (Billions)
		Trend Extended	Fee Increase	Difference (Billions)	
1995	1,330,368	$239,466,240	$275,386,176	$0	$0.036
2000	1,406,603	$253,188,540	$291,166,821	$0.038	$0.038
2005	1,482,838	$266,910,840	$306,947,466	$0.040	$0.040
2010	1,559,073	$280,633,140	$322,728,111	$0.042	$0.042
2015	1,635,308	$294,355,440	$338,508,756	$0.044	$0.044

Source: State of South Carolina Department of Revenue; Sandstone Environmental Associates, Inc.

interstate roads represent about 10 percent of all vehicle miles traveled on all roads, or 5.1 billion. At 20 miles per trip in 2005, trips subject to new interstate tolling will amount to 253.5 million. At 25 cents per trip this produces $63.4 million, or $0.063 billion in 2005 for infrastructure purposes.

Local: Water/Sewer Fees (Table 7)

Average water and sewer fees paid by households in South Carolina are obtained from the South Carolina Department of Health and from local water district records. They are approximately $30 per month per household, or $360 per year. Since about half of South Carolina's dwelling units use septic systems and/or wells, only half the annual fees are applied to household projections to obtain future revenues. The increase in this source of revenue is based on a 15% upward adjustment of sewer and water fees, but no increase in the proportion of homes using public water and sewer systems. Thus, this is also a conservative estimate of future revenues from this source. All revenues from the increased water and sewer fees are allocated to infrastructure funding. In 1995, these water and sewer fees produced about $240 million in annual revenue. In the year 2005, they will produce $267 million. If water and sewer fees are raised by 15 percent, this amounts to an additional $40 million, or $0.040 billion, for infrastructure purposes.

Local: Development Impact Fees (Table 7)

Development impact fees are used sporadically in local governments in South Carolina. They are applied to new housing or nonresidential space as this development comes on-stream. Approximately 10 counties of South Carolina's 46 currently have limited impact fees.

Revenues for development impact fees for 1994 are obtained from the *1994 Annual County Financial Reports for South Carolina*. One-third of the revenue is attributed to 1994 residential (household) growth, and the remainder to 1994 business (job) growth. Revenues from residential sources are projected to 1995 and future years based on a per household value and the projected number of additional households.

Impact fees are set at an average increase of $2,000 per *residential* unit. Revenues from 1994 *nonresidential* sources are converted into a per square foot value based on 250 square feet per new job. Nonresidential impact fee revenues are then advanced to 1995 and projected to future years based on the number of new employees and a space allocation of 250 square feet per employee. Nonresidential impact fees are increased by $1.00 per square foot, and all revenues are allocated to infrastructure funding.

Impact fees raised $25 million in infrastructure revenues as of 1995. They vary significantly, but in most cases are about $200 per unit and an equivalent amount per 1,000 square feet of nonresidential space. If these fees are raised by $2,000 per unit and $1,000 per 1,000 square feet of nonresidential space, or about $1 per square foot in each case, and taken to the average year 2005, about $28 million or $0.028 billion of additional revenues can be raised via this source for infrastructure purposes.

Local Property Tax (Table 8)

The local property tax in South Carolina is based on an assessment ratio of 4 percent for residential properties and 5-6% for nonresidential properties. Higher rates are applied to personal and business property.

Assessment ratios are obtained from the South Carolina Department of Revenue. Adjusted market value and adjusted assessed valuation by county and type of property are obtained from the *Index of Taxpaying Ability and Summary of Education Finance Act Funding Formulas*

TABLE 8
LOCAL PROPERTY TAX REVENUES

1995 Existing Conditions						
County Property Taxes	**Adjusted Market Value**	**Assess -ment Ratio**	**Adjusted Assessed Valuation**	**Local Revenues (W/O School Districts)**	**Local Revenues (School Districts)**	**Total Local Property Tax Revenues**
Average County Tax Rates				0.0513	0.1665	
Type of Property						
Owner Occupied Residential	$58,957,336,562	0.040	$2,358,293,462	$120,888,748	$270,080,682	$ 390,969,430
Multifamily Residential (est.)	$5,050,000,000	0.060	$303,000,000	$15,532,117	$34,700,705	$50,232,823
Commercial Property	$41,823,597,980	0.060	$2,509,415,879	$128,635,451	$287,387,793	$416,023,244
Private Agricultural	$2,212,279,925	0.040	$88,491,197	$4,536,157	$10,134,346	$14,670,504
Corporate Agricultural	$414,755,151	0.060	$24,885,309	$1,275,649	$2,849,960	$4,125,608
Personal Property	$15,208,917,543	0.105	$1,596,936,342	$81,860,734	$182,887,187	$264,747,921
Manufacturing Property	$14,828,509,171	0.105	$1,556,993,463	$79,813,218	$178,312,777	$258,125,995
Utility Property	$10,112,145,478	0.105	$1,061,775,275	$54,427,782	$121,598,518	$176,026,301
Business Personal Property	$4,739,063,448	0.105	$497,601,662	$25,507,615	$56,987,223	$82,494,838
Total	$153,346,605,258	0.065	$9,997,392,590	$512,477,471	$1,144,939,192	$1,657,416,663
Municipal Property Taxes						
Average Municipal Tax Rates				0.0640	0.1399	
Type of Property						
Owner Occ. Residential & Priv. Agr.	$27,346,036,338	0.040	$1,093,841,454	$69,992,564	$105,283,553	$175,276,117
Multifamily Residential	$2,257,615,650	0.060	$135,456,939	$8,667,598	$13,037,893	$21,705,491
Commercial & Corporate Agr.	$18,882,765,757	0.060	$1,132,965,945	$72,496,056	$109,049,332	$181,545,388
Subtotal Real Property	$48,486,417,746	0.049	$2,362,264,338	$151,156,219	$227,370,777	$378,526,996
Personal Property	$2,631,564,464	0.105	$276,314,269	$17,680,756	$26,595,580	$44,276,336
Business Personal Property	$5,135,414,222	0.105	$539,218,493	$34,503,433	$51,900,427	$86,403,860
Subtotal Personal Property	$7,766,978,686	0.105	$815,532,762	$52,184,189	$78,496,007	$130,680,196
Motor Vehicles	$5,252,824,381	0.105	$551,546,560	$35,292,279	$53,087,018	$88,379,297
Total	$56,370,806,591	0.066	$3,729,343,660	$238,632,687	$358,953,802	$597,586,489
Grand Total	$209,717,411,849	0.065	$13,726,736,250	$751,110,158	$1,503,892,995	$2,255,003,153

Year	Summary of Annual Revenues without School Districts			100% Available for Infrastructure
	Trend Extended	Assessment Ratio Increase	Difference (Billions)	
1995	$751,110,158	$790,404,161	$0.039	$0.039
2000	$800,996,205	$853,965,257	$0.053	$0.053
2005	$850,882,253	$917,526,353	$0.067	$0.067
2010	$900,768,318	$971,243,548	$0.070	$0.070
2015	$950,654,383	$1,024,960,743	$0.074	$0.074

Year	Summary of Annual Revenues for School Districts Only			100% Available for Infrastructure
	Trend Extended	Assessment Ratio Increase	Difference (Billions)	
1995	$1,503,892,995	$1,592,781,928	$0.089	$0.089
2000	$1,604,018,607	$1,714,807,118	$0.111	$0.111
2005	$1,704,144,220	$1,836,832,308	$0.133	$0.133
2010	$1,804,269,868	$1,944,597,300	$0.140	$0.140
2015	$1,904,395,516	$2,052,362,292	$0.148	$0.148

TABLE 8 (continued)
LOCAL PROPERTY TAX REVENUES

County Property Taxes	2005 Trend Extended: Adjusted Market Value	Local Revenues (W/O School Districts)	Local Revenues (School Districts)	Total Property Tax Revenues
Average County Tax Rates				
Type of Property				
Owner Occupied Residential	$65,714,282,840	$134,743,491	$301,033,924	$435,777,415
Multifamily Residential (est.)	$5,628,767,303	$17,312,213	$38,677,663	$55,989,875
Commercial Property	$48,066,953,706	$147,837,933	$330,288,555	$478,126,487
Private Agricultural	$2,465,823,546	$5,056,034	$11,295,817	$16,351,852
Corporate Agricultural	$476,669,096	$1,466,075	$3,275,397	$4,741,472
Personal Property	$16,944,841,226	$91,204,199	$203,761,664	$294,965,863
Manufacturing Property	$17,042,083,854	$91,727,600	$204,931,006	$296,658,606
Utility Property	$11,621,669,393	$62,552,669	$139,750,539	$202,303,208
Business Personal Property	$5,446,502,797	$29,315,349	$65,494,179	$94,809,528
Total	$173,407,593,762	$581,215,563	$1,298,508,743	$1,879,724,306
Municipal Property Taxes				
Average Municipal Tax Rates				
Type of Property				
Owner Occ. Residential & Priv. Agr.	$30,480,094,103	$78,014,229	$117,349,825	$195,364,054
Multifamily Residential	$2,516,355,081	$9,660,969	$14,532,132	$24,193,101
Commercial & Corporate Agr.	$21,701,552,983	$83,318,145	$125,532,132	$208,646,176
Subtotal Real Property	$54,698,002,167	$170,993,343	$257,209,988	$428,203,331
Personal Property	$2,931,927,397	$19,698,812	$29,631,161	$49,329,973
Business Personal Property	$5,902,020,141	$39,654,047	$59,648,035	$99,302,081
Subtotal Personal Property	$8,833,947,538	$59,352,859	$89,279,195	$148,632,054
Motor Vehicles	$5,852,374,100	$39,320,488	$59,146,293	$98,466,782
Total	$69,384,323,805	$269,666,690	$405,635,477	$675,302,166
Grand Total	$242,791,917,567	$850,882,253	$1,704,144,220	$2,555,026,472

County Property Taxes	2005 Assessment Increase: Adjusted Market Value	Assessment Ratio	Adjusted Assessed Valuation	Local Revenues (School Districts)	Total Revenues
Average County Tax Rates					
Type of Property					
Owner Occupied Residential	$65,714,282,840	0.045	$2,957,142,728	$338,663,164	$490,249,592
Multifamily Residential (est.)	$5,628,767,303	0.065	$365,869,875	$41,900,801	$60,622,698
Commercial Property	$48,066,953,706	0.065	$3,124,351,991	$357,812,601	$517,970,361
Private Agricultural	$2,465,823,546	0.045	$110,962,060	$12,707,795	$18,395,833
Corporate Agricultural	$476,669,096	0.065	$30,983,491	$3,548,347	$5,136,595
Personal Property	$16,944,841,226	0.110	$1,863,932,535	$213,464,600	$309,011,856
Manufacturing Property	$17,042,083,854	0.110	$1,874,629,224	$214,689,625	$310,785,206
Utility Property	$11,621,669,393	0.110	$1,278,383,633	$146,405,326	$211,936,694
Business Personal Property	$5,446,502,797	0.110	$599,115,308	$68,612,950	$99,324,267
Total	$173,407,593,762	0.070	$12,205,370,844	$1,397,805,209	$2,023,466,103
Municipal Property Taxes					
Average Municipal Tax Rates					
Type of Property					
Owner Occ. Residential & Priv. Agr.	$30,480,094,103	0.045	$1,371,604,235	$132,018,554	$219,784,561
Multifamily Residential	$2,516,355,081	0.065	$163,563,080	$15,743,143	$26,209,193
Commercial & Corporate Agr.	$21,701,552,983	0.065	$1,410,600,944	$135,772,034	$226,033,357
Subtotal Real Property	$54,698,002,167	0.054	$2,945,768,259	$283,533,730	$472,027,111
Personal Property	$2,931,927,397	0.110	$322,512,014	$31,042,168	$51,679,019
Business Personal Property	$5,902,020,141	0.110	$649,222,216	$62,488,417	$104,030,752
Subtotal Personal Property	$8,833,947,538	0.110	971,734,229	$93,530,586	$155,709,771
Motor Vehicles	$5,852,374,100	0.110	$643,761,151	$61,962,783	$103,155,676
Total	$69,384,323,805	0.066	$4,561,263,639	$439,027,099	$730,892,558
Grand Total	$242,791,917,567	0.069	$16,766,634,483	$1,836,832,308	$2,754,358,660

Sources: State of South Carolina Department of Revenue; Sandstone Environmental Associates, Inc.

published by the South Carolina Department of Education. (The multifamily residential category is derived from further calculations based on the *1994 Annual County Financial Reports*). Assessed values for municipalities are obtained from the South Carolina State Budget and Control Board. The state total for municipal assessed valuation is divided into the additional categories of real and personal property according to observed ratios at the county level. Market values for municipalities, by property type, are calculated by dividing assessed valuations by their respective assessment ratios.

Property tax rates for 1995 for each municipality, county, and school district are obtained from the South Carolina Department of Commerce in their *1995 Property Tax Survey* publication. State totals for property tax revenues from counties and municipalities are obtained from computer printouts of regional councils of governments (COGs). Average county and municipal tax rates derived from the *Index of Taxpaying Ability* are adjusted slightly so that calculated 1995 total state revenues match the 1995 state revenues shown on the computer printouts from the COGs. An additional adjustment is necessary for the school district revenues, as some school districts are dependent on their counties or municipalities and are already included in county or municipal budgets. This additional adjustment factor is .6888 times the share of the school budgets derived from local property taxes.

Market values of residential and nonresidential property (including real and personal property) are calculated for the future based on projections of households and employment. The relevant assessment ratios and property tax rates are applied to obtain future property tax revenues. Increased property tax revenues are composed of an assessment increase of 0.005 for all real and personal property tax categories. All of the revenue from the assessment increase is allocated for infrastructure funding.

The local (county, municipal, and school districts) property tax yields $2.25 billion annually in South Carolina. Two thirds of this comes from school districts; one-third from counties and municipalities. By mid-period (2005), combined property tax yields will approach $2.55 billion annually. If all assessments are raised by one-half percentage point, property tax yields will increase, on average, by 20 percent. This will produce $199 million, or $0.199 billion, for infrastructure purposes.

Total Revenues for Infrastructure Purposes (Summary Table)

The total amount to be raised for infrastructure purposes is $2 billion annually. About 73% of this can be raised from existing sources of general fund and intergovernmental transfers ($1.46 billion). About 27 percent may have to come from new revenues ($0.54 billion). Other states have turned to additional taxes and user charges to respond to this funding gap; full funding requires significant sums from multiple sources of revenue. Most local revenues would come from a small property tax or local options sales tax increase; most state revenues from a sales tax increase. Another significant source of revenue would be a small gasoline tax increase at the state level passed wholly to the local level. Without these additional sources of revenue, a portion of infrastructure need clearly will have to be deferred.

ALLOCATIONS TO INFRASTRUCTURE GROWTH (BILLIONS) IN 2005

Table No.	Item	State Budget: Mid Period (2005) Revenues	% Available for Funding	Funds for Infrastructure
	Current Budget Dedications			
1	State General Fund and Other Revenues	$3.288	10.0%	$0.329
3	Intergovernmental Transfers			
	Federal Funds	$3.849	10.0%	$0.385
	Earmarked Funds	$2.566	5.0%	$0.128
	Subtotal	$6.415		$0.513
	Increases			
4	Sales Tax Increase (0.5%)	$0.159	100.0%	$0.159
	Subtotal	$0.159		$0.159
5	State Gas Tax Increase ($0.01) (For Counties)	$-	-	$-
6	New User Charges			
	Toll Road Fees ($0.25/trip)	$0.063	100.0%	$0.063
	Subtotal	$0.063		$0.063
	Total	$9.926		$1.065

Table No.	Item	County/Municipal Budgets: Mid Period (2005) Revenues	% Available for Funding	Funds for Infrastructure	Total Funds for Infrastructure
	Current Budget Dedications				
2	County/Municipal/School District Revenues	$2.205	10.0%	$0.221	$0.549
3	Intergovernmental Transfers				
	Federal Funds to Counties/Municipalities	$0.058	10.0%	$0.006	
	State Funds to Counties/Municipalities	$0.244	10.0%	$0.024	
	Federal & State Funds to School Districts	$3.682	10.0%	$0.368	
	Subtotal	$3.983		$0.398	$0.911
	Increase				
4	Local Option Sales Tax Expansion				
	Counties	$0.063	29.0%	$0.018	
	Municipalities	$0.040	29.0%	$0.012	
	Subtotal	$0.104		$0.030	$0.189
5	State Gasoline Tax Increase ($0.01)	$0.028	100.0%	$0.028	$0.028
7	New User Charges				
	Development Impact Fee Increases				
	Residential ($2,000/Residence)	$0.022	100.0%	$0.022	
	Nonresidential ($1/Square Foot)	$0.006	100.0%	$0.006	
	Increase (15%)	$0.040	100.0%	$0.040	
	Subtotal	$0.068		$0.068	$0.132
8	Local Property Tax Increase (0.5%)	$0.199	100.0%	$0.199	$0.199
	Total	$6.547		$0.945	$2.009

CONCLUSION

The example calculation for full funding of infrastructure needs, based on the experience of other states, represents a difficult pill to swallow for these states at both state and local levels. Significant revenues must be dedicated from existing sources of revenue, and new revenues must be found to fill the gap. Neither of these are popular choices—especially the latter. However, in order to grow predictably without overutilitizing existing infrastructure, most infrastructure expenditures should be funded. While the example shown in this portion of the report may not prove to be the chosen path of South Carolina legislators, some new sources of revenue may have to be dedicated to infrastructure finance in the future.

SECTION V

SUMMARY OF FINDINGS OF THE INFRASTRUCTURE STUDY AND THE IMPLEMENTATION ACTIVITIES OF OTHER STATES: THE FORMULATION OF AN INFRASTRUCTURE BUSINESS PLAN

INTRODUCTION AND OVERVIEW

INTRODUCTION

Discussion: Components of the Summary Report

This is the fifth section of the report on statewide infrastructure needs produced for the South Carolina Advisory Commission on Intergovernmental Relations. Findings of the analyses are presented in this summary section and for the four other sections dealing with:

(1) Gross Infrastructure Needs and Costs—1995–2015
(2A) Reducing Infrastructure Costs through Alternative Means of Provision, Technology Improvements, and Regionalization
(2B) Reducing Infrastructure Costs through Costs of Sprawl Reductions
(3) Revenue and Finance Alternatives and Projections

The summary that follows attempts to highlight materials from each of the previous sections. It serves as a "quick" study of more than 400 pages of detailed cost and revenue projections. Lists of activities of other states in education and implementation of programs are also included in this summary.

Why was this study undertaken, and why is it so important at this particular time? Earlier on, information was presented on the growth of South Carolina both within a national context and for subregions of the state. What was clear from this presentation is that most subjurisdictions of the state of South Carolina have been growing, making it one of the fastest-growing states in the nation. Both the South as a region of the United States and South Carolina as a component of the South have been experiencing major population and employment growth. A time of economic boom is at hand for both. Whereas this boom took place in other southern states in the 1970s and 1980s, South Carolina had not experienced it until the mid-1990s. The next 10 to 20 years will be a period of change for South Carolina. The state must be prepared to support growth by building an array of necessary infrastructure.

This is precisely the information presented on the pages that follow. It is a blueprint for how South Carolina can respond to the growth that is already on its doorstep. The blueprint for infrastructure response calls for:

1. A comprehensive program of education of elected officials, business leaders and the general public;

2. An assessment and inventory of resources, including state and local monies now being spent for infrastructure, to enable South Carolina to do more with existing resources;

3. A fundamental reform and restructuring of state government that would:
   a. establish a central authority or coordinating body;
   b. establish a planning and infrastructure prioritizing process;
   c. recommend specific ways to eliminate duplication and fragmentation among existing state and local agencies responsible for infrastructure projects;
   d. recommend changes in legislation and regulation that will make South Carolina's infrastructure more efficient;
   e. propose funding alternatives.

GROWTH IN SOUTH CAROLINA

STATE AND REGIONAL GROWTH

Findings:
The Future Growth of South Carolina

South Carolina is a state whose 1995 3.7 million population and 1.6 million job base has increased by one-third and one-half, respectively, since 1970. In the next twenty years, by the year 2015, South Carolina will increase its population by about 23%, or over 840,000, and will increase its job base by 30%, or 480,000. (See Figure 2.) It is a state that attracted $5.4 billion in non-residential development investments in 1995, and nearly $5.7 billion in 1996. The jobs emerging from this growth—nearly 24,000—paid an average 1995 wage of $28,500, $6,000 higher than the state average, and $2,000 higher than the national average. New 1996 employment data is even more favorable, showing new job creation at about 26,000 with an average wage of over $30,200—30 percent higher than the state's average wage and 33 percent higher than the national wage for private sector industries.

Findings:
Regional Growth—The "Known Five"

The vast majority of the growth is occurring in five of the state's ten regions. (See Figures 1 [map] and 2.) The Appalachian (Greenville-Spartanburg) Region in the northwestern portion of the state is the home of BMW's domestic production facilities. In 1995, this region had the largest share of population (26%) and employment (29%) in the state. It is within the I-85 corridor from Atlanta to Washington, D.C., and is home to most of the blue-chip plants and manufacturing facilities that have come to South Carolina. By 2015, its population will increase by 23 percent and its employment by 24 percent.

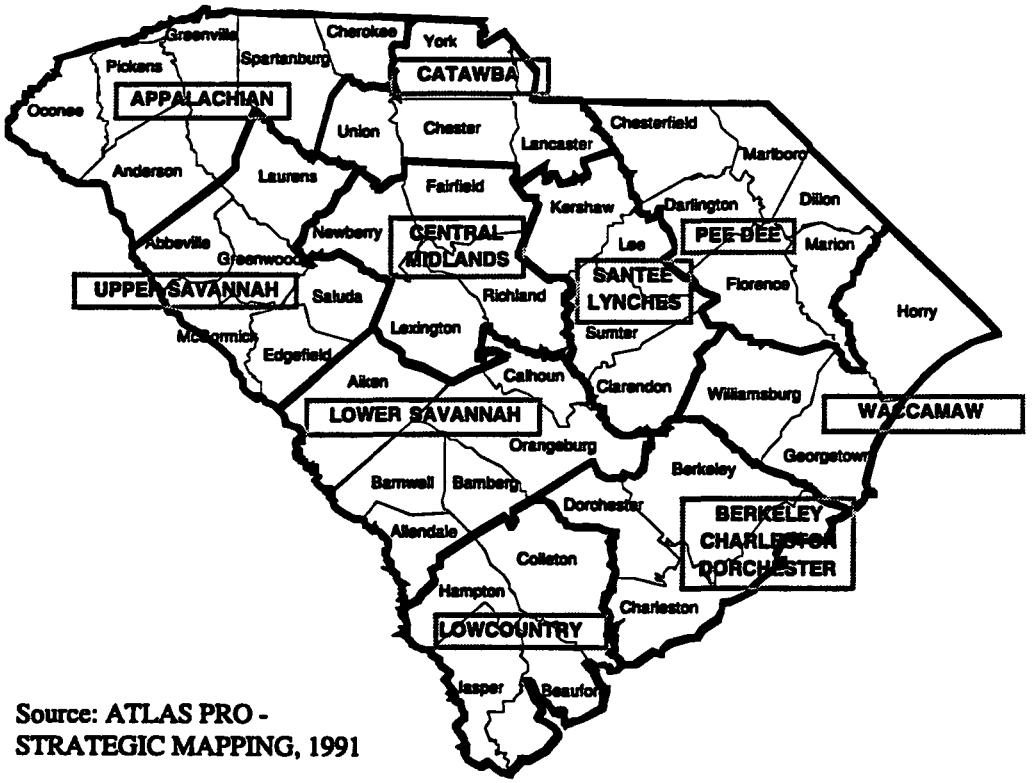
The Central Midlands Region is the home of the state's capital (Columbia) and is the center of white-collar growth in the form of private-sector professionals, government workers, and university faculty, students, and staff. This region, which is cross-cut by Interstates 20 and 26, has 15 percent of the state's population and 18 percent of its job base. Population is expected to grow in this region by 24 percent and employment by 30 percent by the year 2015.

Charleston, on the eastern coast toward the middle of the state, is the home of port-oriented activities, the military, and cultural tourism. It is part of the Berkeley-Charleston-Dorchester Region, which is accessed from the north and south via Interstates 95 and 26. It has slightly less population than the (7%) Central Midlands Region and about 26 percent less employment. It will grow by 22 percent in population and 50 percent in employment over the 20-year period 1995–2015.

The Myrtle Beach area, or the Grand Strand, is part of the Waccamaw Region. It is located along U.S. Highway 17 in the northeastern part of the state. This region, known for beach-oriented tourism and golf, is one of the fastest-growing regions in the state. Over the next twenty years, growth will increase population by 41 percent and employment by 32 percent.

Hilton Head is part of the Lowcountry Region and is accessed via Interstate 95 in the extreme southern part of the state. This area, once known primarily for retirement or second-home development on Hilton Head Island, is now experiencing significant off-island

Figure 1
Counties (46) and COG Regions (10) in the State of South Carolina



Source: ATLAS PRO - STRATEGIC MAPPING, 1991

Figure 2
Population and Employment Growth in South Carolina 1995-2015

COUNTY / REGION	*Population*				*Employment*			
	1995	*2015*	*Change #*	*Change %*	*1995*	*2015*	*Change #*	*Change %*
S.C. STATE TOTAL	3,684,715	4,525,852	841,127	23%	1,609,678	2,090,258	480,570	30%
UPPER SAVANNAH	193,100	217,500	24,400	13%	74,410	85,250	10,840	15%
PEE DEE	322,700	346,100	23,400	7%	127,770	156,550	28,780	23%
CATAWBA	263,900	346,844	82,944	31%	94,530	120,750	26,220	28%
WACCAMAW	246,300	346,600	100,300	41%	111,380	146,700	35,320	32%
LOW COUNTRY	167,500	226,000	58,500	35%	62,970	94,200	31,230	50%
LOWER SAVANNAH	284,200	344,500	60,300	21%	111,440	137,900	26,460	24%
CENTRAL MIDLANDS	548,300	680,300	132,000	24%	284,970	369,850	84,880	30%
SANTEE LYNCHES	203,300	234,100	30,800	15%	65,280	87,100	21,820	33%
APPALACHIAN	946,100	1,163,400	217,300	23%	466,330	576,250	109,920	24%
BERKELEY-CHARLESTON-DORCHESTER	508,317	619,500	111,183	22%	209,600	314,700	105,100	50%

population and employment growth. It is the smallest region for both aggregate population and employment, but over the next twenty years, it will be the second fastest-growing region in population and tied for first place in employment growth.

Findings:
Regional Growth—The "Comers"

The above five regions represent 66 and 71 percent of the state's population and employment, respectively; they represent about 74 and 76 percent of projected growth in these two sectors (see Figure 2). Thus, although these areas have been and will continue to be the areas that are immediately identifiable with South Carolina's future growth, growth will take place in other regions of the state as well.

Of the earlier-mentioned "Known Five" regions, the Lowcountry has the smallest projected population growth—an increase of only 60,000 over the twenty-year period.

Of the remaining regions, the Upper Savannah, surrounding the Sumter National Forest, is and will continue to be a significant tourist destination. It has been discovered by such national and international firms as Sara Lee (baked goods) and Fuji (film production). However, although it is embraced by Interstates 20, 26, 385 and State Road 72, the Upper Savannah Region lacks an interstate in and around Greenwood. Even though its population is currently about 15 percent greater than the Lowcountry Region's, over the next twenty years, the Upper Savannah Region's population and employment will grow by only 35 to 40 percent that of the Lowcountry Region.

The Catawba Region in the north-central part of the state is bisected in a north-south direction by Interstate 77, which runs from Columbia, SC to Charlotte, NC. It is largely influenced by the growth of Charlotte, particularly as this city affects suburban York County. The Catawba Region's population will grow by about 83,000 or 31 percent over the period 1995-2015. Its job base is expected to increase by about 26,000—roughly half the rate of the Lowcountry and nearly twice the rate of the Upper Savannah Region.

The Lower Savannah Region, surrounded by Interstates 20 and 26 in the north and the US Route 301–I-95 corridor in the south, will grow by 60,000 in population (21%) and 26,000 in jobs (24%). Eighty percent of the growth in population and 48 percent of the growth in jobs will take place in Aiken County, which is influenced heavily by events in Augusta, Georgia. The remaining counties of the region are rural–agricultural in nature—and will grow slowly in absolute terms over the period.

The changing military priorities of the U.S. government will continue to heavily influence the economy of the Santee Lynches Region, the region immediately east of the one containing the state capital. Population will grow by 31,000 or about 15 percent, and employment by 22,000 or about one-third. The region is traversed by Interstate 20 in an east-west direction in its northern half and by I-95 in a north-south direction in its lower half. Fifty-six percent of the region's population growth and 47 percent of the employment growth will take place in Sumter County.

The Pee Dee Region, northwest of Myrtle Beach and on the border of North Carolina, has the slowest projected population growth in the state. But the region's population will still grow by about 23,000 and its job base by about 29,000 over the next twenty years. The region is divided by Interstate 95 in a north-south direction; however, it lacks an equivalent east-west thoroughfare.

State Road 501 is underdeveloped in this region.

What Other States Have Done: Future Growth Policy

The state of South Carolina will continue to be a magnet for residential, commercial, and industrial development in the foreseeable future. Analyzing and choosing between measures that other states have undertaken will help ensure that this future growth occurs in a manner that maximizes use of the state's infrastructure and minimizes disruptions to its environment and natural resources. To react to growth, other states have adopted the following types of actions:

- Development is directed both to existing growth areas (but in more compact form) and to areas that are not growing, in the form of newly designated centers. Both of these types of locations maximize the use of existing and future infrastructure.
- Growth is viewed in the context of an overall infrastructure plan to meet both economic and social needs.
- The concept of "minimal thresholds" is used for those locations that are being bypassed by growth.
- The concept of "locational limits" is used for those locations that border sensitive natural habitats.
- The concept of a "carrying capacity" is used for those areas that are nearing the saturation point for new growth.
- Links between those regions that are joined by functional parallelism and complementarity are established.
- The special needs of industries that require specific natural resources are emphasized.
- The responsibility for infrastructure planning activities for the state is often undertaken by a newly created office in the state treasury department or budget office.

In short, the idea of "Strategic Economic Development" is a guiding concept in directing future economic growth in other states. This entails both the targeting of critical capital spending to expand existing growth nodes and selected capital spending to attract new enterprises to areas in which they currently do not exist. This two-prong approach is one that neither accepts limits to current growth nor allows this growth to cause regional disparity or dysfunction. The above strategy is accomplished by the aggressive management of public resources to avoid ill-timed or inappropriately located capital facilities.

INFRASTRUCTURE NEED

STATEWIDE AND REGIONAL INFRASTRUCTURE NEED

Discussion: The Nature and Value of Infrastructure

Infrastructure is defined as roads, bridges, mass transportation, airports, ports and waterways, water supply, waste treatment and disposal, energy supply, and communications. Infrastructure in the nation's 83,000 cities and other local jurisdictions is directly linked to the national economy. It is the foundation upon which industrial wealth is created; it is utilized by every citizen and all industries.

Economic development is the growth of residential and nonresidential structures on primarily private lands. Beneficial economic development improves both the quality of life and standard of living of a state's residents. It does this by targeting areas of critical capital spending to expand existing growth nodes and to encourage new enterprises in areas where they currently do not exist. Business decisions about where to locate in a state are heavily influenced by factors that encourage business growth. In addition to a skilled labor force, these factors include adequate public facilities and a high quality of life. The absence of water and sewer curtails the construction of businesses and housing. The increasing costs of solid waste disposal drive up industrial and commercial expenses and reduce personal disposable income. Clogged transportation arteries frustrate commuters and disrupt the delivery of goods and services. The careless use of open space and the inadequacy of recreational services make a state less attractive to businesses, residents, and tourists.

In a free-enterprise economy a state's economic health depends upon growth. Growth produces jobs, housing, and commerce. Growth is needed to generate tax revenues to maintain roads, transit systems, water and wastewater systems, and other infrastructure. The answer to growth accommodation lies neither in limiting development nor passively accepting its consequences: it resides in managing public investment in infrastructure and natural resources wisely and in strategic economic development. Without growth, bills can't be paid; conversely, with too much growth infrastructure can't be provided quickly enough.

Although seemingly obvious, it is easy to overlook the relationships between growth, required infrastructure, and quality of life. Few areas, other than those that are growing, can claim appreciating property values, access to meaningful employment, superior systems of education, low crime rates, and significant recreational and cultural amenities for residents. The above locations all score highly in surveys of resident satisfaction, and all are at the top of the list of most quality of life polls. Well-planned growth receives high marks from residents who, in turn, realize that better living environments may cost more, but the benefits far outweigh the costs.

One way to deal with growth is to try to assure that there is ample infrastructure both currently in place and projected for the future. This undertaking begins with a projection of infrastructure need for both the state and its subjurisdictions by type of infrastructure.

INFRASTRUCTURE NEED

Discussion:
Components of Infrastructure

Infrastructure need in the State of South Carolina is comprised of seven major categories of capital infrastructure that group 28 different facets of growth-related capital outlays. The major categories of expenditure are:

- Transportation
- Commerce
- Public Safety, Administration and Welfare
- Education
- Health
- Recreation and Culture
- Environment

Infrastructure is divided into *regional* need (state- or COG-required) and *local* need (county- or municipality-required). It is also divided into *backlog* (deferred from completion), *rehabilitation* (system repair and improvement), and *new growth* needs (additionally required capital facilities).

Findings:
Infrastructure Need Statewide by Type and Category

State infrastructure needs for South Carolina amount to about $57 billion currently and over the twenty-year period 1995 to 2015 (Figure 3). More than 58 percent of this infrastructure need is related to new growth ($30 billion); about 25 percent of that amount is related to rehabilitation needs; and approximately 17 percent is related to backlog. It is assumed that backlog will be met during the twenty-year period and that it will not reoccur over the period. System upgrading (rehabilitation) will take place continuously, including that required for new growth infrastructure as it ages over time.

By far the most significant category of statewide infrastructure need is that related to transportation. This category alone amounts to 51 percent of the infrastructure need projection, of which road expenditures constitute three-quarters.

Other significant statewide categories of infrastructure requirements are: education (18% of total); health (14%); commerce (7%); public safety, administration and welfare (5%); the environment (3%); and recreation and culture (3%).

In terms of *both* existing development and new growth, the most significant capital expenditures are roads, bridges, public education and higher education, water, sewer, and economic development. On a per capita basis (including all residents and employees), new growth infrastructure need amounts to about $5,000 per existing state resident/employee over the next twenty years, and backlog/rehabilitation costs (system maintenance) amount to $3,600 per existing resident/employee. These total to $8,600 per capita and are daunting, but very realistic, levels of infrastructure need by any estimate.

Findings:
Infrastructure Need by Region

Infrastructure need within the state's ten regions ranges from a high of $12 billion to a low of $2 billion. In the first case this represents the Appalachian region; in the second, the Santee Lynches Region. The highest-spending regions contain the growth nodes of Greenville-Spartanburg and

Charleston; the lowest-spending region is comprised of slower-growth counties in a region west of the state's capital.

What Other States Have Done: Recognizing and Addressing Infrastructure Need

- They have recognized that infrastructure need is not going to go away. They have embraced and addressed it.
- They have recognized the relative requirements for infrastructure—by type—and, as well, revenue-raising ability to support the infrastructure needs of various types. Even though transportation dominates infrastructure need, significant capital expenditures take place across all types of infrastructure.
- Similarly, they have attempted to understand the locational demands of infrastructure. Most infrastructure is built in locations where it already exists. This is not to say that slowly developing areas have insignificant infrastructure needs.
- They understand and appreciate the significance of the need numbers in terms of the magnitude of the burden and where money will come from.
- Relationships between new growth and backlog/rehabilitation are understood in terms of allocating future and current resources.
- Relationships between local and regional needs are understood in terms of designating future funders of capital facilities.
- The scale of the problem is comprehended and communicated to gather consensus and support for future action. The consequences of doing nothing more than is currently being done are clearly understood.

Figure 3
SOUTH CAROLINA INFRASTRUCTURE NEEDS (1995-2015)
(in millions of current dollars)
STATE TOTAL

Service Area	*Regional*	*Local*	*Backlog*	*Rehab*	*New Growth*	*Total*
TRANSPORTATION						
Roads	13,426	8,320	3,098	5,488	13,160	21,746
Bridges	2,933	116	185	287	2,577	3,048
Public Transportation	857	330	216	428	543	1,187
Freight (Rail and Road)	245	71	68	146	102	316
Ports/Maritime Activities	1,471	215	338	674	674	1,686
Aviation (Including Air Freight)	427	380	164	239	404	808
Other Transportation Facilities	16	5	4	4	13	20
Total	**19,375**	**9,437**	**4,073**	**7,265**	**17,473**	**28,811**
COMMERCE						
Economic Development	1,699	370	229	85	1,754	2,069
Farmland Retention	52	21	53	9	10	72
Energy	309	85	23	221	150	394
Telecommunications	1,286	31	52	456	809	1,317
Total	**3,346**	**506**	**357**	**772**	**2,723**	**3,852**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE						
Public Safety (Jails)	547	1,020	272	245	1,051	1,567
Justice (Courts)	146	339	94	157	234	485
Public Admin./ Instit./ Hsg.	180	401	145	137	298	581
Total	**873**	**1,760**	**511**	**539**	**1,584**	**2,634**
EDUCATION						
Public Education	697	6,346	1,893	1,943	3,207	7,043
Higher Education	2,629	546	152	487	2,536	3,175
Total	**3,326**	**6,892**	**2,045**	**2,430**	**5,743**	**10,218**
HEALTH						
Public Health Care	814	580	382	391	621	1,394
Water Supply	85	2,265	341	585	1,424	2,350
Waste Water Disposal	816	2,176	530	781	1,681	2,992
Solid Waste Management	259	788	540	352	155	1,047
Total	**1,973**	**5,810**	**1,794**	**2,109**	**3,880**	**7,783**
RECREATION AND CULTURE						
Recreational Facilities	155	456	104	172	335	611
Arts / Library	225	252	159	85	233	477
Historic Resources	243	186	98	152	178	427
Total	**623**	**893**	**361**	**408**	**746**	**1,516**
ENVIRONMENT						
Storm Water Management	230	666	141	254	501	896
Shore and River Protection	242	183	64	204	158	426
Sensitive Land and Water	123	140	49	23	191	263
Open Space	66	167	115	56	61	233
Air Pollution	32	15	8	27	12	48
Total	**693**	**1,172**	**378**	**564**	**923**	**1,865**
OVERALL TOTAL	**30,208**	**26,470**	**9,518**	**14,088**	**33,072**	**56,678**

Source: Rutgers CUPR; Wilbur Smith Associates; Siemon, Larsen & Marsh; Sandstone Environmental Associates - Projections, August 1996

REDUCTION OF INFRASTRUCTURE NEED EXPENDITURES THROUGH TECHNOLOGY, REVISIONS IN DELIVERY SYSTEMS, AND GROWTH PATTERNS

REDUCTIONS IN COSTS THROUGH TECHNOLOGY AND REVISIONS IN WAYS AND MEANS OF PROVISION

Discussion: How Infrastructure Cost Projections Can Be Reduced

The basis of infrastructure cost projections is that infrastructure will be provided in the future in the same way that it has been provided in the past. In reality, there are ways to provide infrastructure that are much more innovative than approaches typically used in the past. These include alternative ways of providing infrastructure, improvements in technology, and a regional approach to infrastructure provision by sharing costs and resources. These innovations affect both new infrastructure (backlog and new construction) and the rehabilitation of existing infrastructure.

In the first case, there are improvements in the construction and road-building processes that significantly reduce labor costs required for such capital construction. There are further improvements in building materials that can reduce the costs of roads, water/sewer infrastructure, and public buildings. Finally, there are ways to share infrastructure such that not as much infrastructure is consumed by the same number of participants.

The first category is represented by the use of new satellite guidance systems that can accomplish automatic grading of roads and locational positioning of water and sewer lines, utilities, and cable. The second is represented by more durable and cheaper concrete roadways that can be built by mixing portions of old concrete and new roadway materials. Similar material advances have been made for the construction of public buildings and for water/sewer piping. The third category is represented by multiple counties sharing a public justice complex. This saving of two significant public buildings enables more effective use of time and space.

Discussion: Calculating Potential Infrastructure Savings

Information on potential savings was obtained from infrastructure providers, e.g., state road departments; professional organizations, for example, the American Public Works Association (APWA); and product technology groups, for example, the American Society for Testing Materials (ASTM).

Two basic pieces of information were included:

1. the share of infrastructure that the component that could undergo savings represented, and
2. the savings that potentially could be realized.

These were multiplied to produce the reductions in cost that could take place in each category of infrastructure.

The three potential means of savings were applied serially—that is, alternative ways of infrastructure provision, then technology, and finally, sharing of resources. Savings were calculated for each of the seven groupings, including 28 categories of infrastructure as well as for rehabilitation and new construction. (Backlog was assumed to be similar to new construction.)

Discussion: Procedural Example

The example below shows the type of information that was provided for arts and libraries.

TABLE 1A
Arts/Library Infrastructure Cost Reductions:
New Growth

TECHNOLOGICAL ADVANCES

Discussion	1. The electronic availability of reference material by way of the Internet offers substantial opportunities for cost reductions in the provision of library facilities. 2. The likelihood of substantial cost reductions in the provision of cultural arts facilities as a result of technological advances other than libraries is relatively small given the cultural arts experience.
Estimated Savings (in percent)	1. The potential savings related to technology advances is subject to issues of public policy in regard to continued provision of library facilities with books. If public policymakers opt for electronic libraries, cost reductions could be significant—as much as 50 percent. 2. None
Sources	1. American Library Association 2. Consultant knowledge, experience, and analysis

ALTERNATIVES TO TRADITIONAL CONSTRUCTION/RESOURCE SHARING

Discussion	Inclusion of community libraries or cultural arts facilities in private buildings can result in savings. For example, the construction of a facility on privately donated land can reduce overall costs by the costs of land and further through the use of shared parking.
Estimated Savings (in percent)	Up to 10 percent
Sources	Government Finance Officers Association

These estimates of savings were individually linked to a specific category of infrastructure for both new construction (including backlog) and rehabilitation. Care was exercised to avoid duplication and overstatement of savings. If there was an area of innovation applicable to several infrastructure categories, each category was credited accordingly; if multiple strategies applied to the same category, their individual effects were netted out from each other to determine a combined impact. If there was no documentable source of innovation, the infrastructure cost amount was left unchanged.

Findings: Savings Related to Technology and Ways and Means of Provision

Alternative-mode provision strategies and technological improvements produce savings that amount to approximately 25 percent overall, or about $13.9 billion (Figure 4). The remaining infrastructure costs that cannot be addressed by alternative ways and means of provision or by technology amount to $42.8 billion.

Nearly three-quarters of the cost reduction—or $10.3 billion—results from alternatives in construction methods/approaches. The largest savings are in the transportation category, since it represents the biggest category of spending. About $4.9 billion could be shaved off the projected $28.8 billion transportation bill. The remaining savings, related to technology, are $3.2 billion; for regional sharing, they amount to $360 million.

On the whole, however, savings are broad-based and significant. What has been demonstrated here is that if a concerted effort is made to pursue the most innovative forms of infrastructure development, about one-quarter of gross

costs can be reduced. This requires a concerted effort on the part of infrastructure providers to constantly seek innovation and least-cost measures, consistent with maintaining quality, in infrastructure provision.

What Other States Have Done: Use Technology to Curb Costs

The savings described in this report have been realized elsewhere by agencies and offices of government undertaking these cost saving measures. In several states, a central office began evaluating and implementing the most significant types of savings. Working together with state departments of transportation, commerce, justice, education, health, environmental protection, and other executive agencies, the central offices found that they were able to realize the following orders of magnitude of savings related to the specific types of activities discussed below.

- *Several billions of dollars were saved through new construction management techniques.* Central offices examined how "Best Practices" construction techniques were developed in their own states' context. They implemented the comprehensive Design-Build-Operate-Maintain approach to capital construction projects.
- *Approximately the same level of savings was achieved by the creation of public-private partnerships.* States began changing public perceptions to accept the private provision of public infrastructure. They reviewed how other governments contracted out road, airport, prison, and economic development construction.
- *About the same level of savings was realized by regulatory reform.* Zoning, building codes, and other rules and regulations are meant to protect citizens', workers', and consumers' lives, health, and property. Too often, however, they have stifled productivity and escalated costs to prohibitive levels. Other states have encouraged the "partnering" of regulatory agencies and contractors to replace a less productive adversarial relationship with a more effective cooperative union. Likewise, they have allowed contractors more scheduling flexibility in their operations. These two actions have saved hundreds of million of dollars in these locations.
- *Savings similar to those achieved by regulatory reform were realized from modularization and standardization of construction.* States have found that some portions of infrastructure translate into huge cost reductions. They have directed education programs to infrastructure providers to encourage their acceptance of these techniques.
- *Again, a similar amount was saved through improved maintenance programs.* States have found that overcoming public, legislative, and bureaucratic short-sightedness is the primary challenge of a central agency when developing a plan to capture the savings from improved maintenance programs. These states have found the political will to regularize and rationalize maintenance and have saved hundreds of millions of dollars in emergency and ad hoc repair costs.
- *Nearly the same amount of savings was realized through increased computerization and improved telecommunications.* States have encouraged software and hardware providers to talk to local builders and inspectors. At stake was more than a billion dollars in potential

savings—because the right technology was disseminated to the appropriate people.

- *Similar amounts were saved through the use of new composite materials.* States have found that research in materials science provides a stream of new products that make infrastructure less costly to erect and cheaper to maintain. They have developed outreach programs to overcome the construction industry's historical conservatism in adopting new or innovative materials.

Tens of billions of dollars in infrastructure cost reductions have been harvested elsewhere. Scores of savings techniques have been outlined in this series of reports, and the largest are broken out above. Other states have used this list as a jumping-off point to begin to come to grips with the infrastructure cost-revenue gap.

Figure 4
SOUTH CAROLINA INFRASTRUCTURE SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
STATE TOTAL

		Savings from						
		Alternatives		*Technology*		*Regionalization*		
Service Area	*Original*	*$*	*%*	*$*	*%*	*$*	*%*	*Final*
TRANSPORTATION								
Roads	21,746	3,861	18	762	4	124	1	16,998
Bridges	3,048	411	13	222	7	2	0	2,413
Public Transportation	1,187	141	12	16	1	8	1	1,022
Freight (Rail and Road)	316	50	16	19	6	1	0	246
Ports	1,686	236	14	94	6	3	0	1,352
Aviation (Including Air Freight)	808	165	20	59	7	8	1	576
Other Transportation Facilities	20	4	19	0	1	-	-	16
Total	**28,811**	**4,867**	**17**	**1,173**	**4**	**147**	**1**	**22,623**
COMMERCE								
Economic Development	2,069	412	20	284	14	18	1	1,355
Farmland Retention	72	12	16	1	1	1	2	58
Energy	394	62	16	18	5	1	0	313
Telecommunications	1,317	181	14	53	4	-	-	1,084
Total	**3,852**	**666**	**17**	**355**	**9**	**20**	**1**	**2,810**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	1,567	472	30	92	6	-	-	1,004
Justice (Courts)	485	84	17	24	5	-	-	377
Public Admin./ Instit./ Hsg.	581	135	23	38	7	-	-	408
Total	**2,634**	**691**	**26**	**154**	**6**	**-**	**-**	**1,789**
EDUCATION								
Public Education	7,043	1,664	24	352	5	-	-	5,028
Higher Education	3,175	501	16	190	6	-	-	2,484
Total	**10,218**	**2,164**	**21**	**543**	**5**	**-**	**-**	**7,512**
HEALTH								
Public Health Care	1,394	399	29	84	6	8	1	903
Water Supply	2,350	282	12	276	12	68	3	1,724
Waste Water Disposal	2,992	362	12	360	12	48	2	2,222
Solid Waste Management	1,047	206	20	38	4	5	0	798
Total	**7,783**	**1,248**	**16**	**758**	**10**	**130**	**2**	**5,646**
RECREATION AND CULTURE								
Recreational Facilities	611	153	25	31	5	-	-	428
Arts / Library	477	88	18	48	10	-	-	342
Historic Resources	427	87	20	10	2	8	2	322
Total	**1,516**	**327**	**22**	**88**	**6**	**8**	**1**	**1,092**
ENVIRONMENT								
Storm Water Management	896	201	22	102	11	30	3	562
Shore and River Protection	426	69	16	15	3	2	0	340
Sensitive Land and Water	263	36	14	16	6	11	4	200
Open Space	233	47	20	6	3	12	5	168
Air Pollution	48	7	15	3	7	0	1	37
Total	**1,865**	**360**	**19**	**143**	**8**	**56**	**3**	**1,307**
OVERALL TOTAL	**56,678**	**10,324**	**18**	**3,214**	**6**	**362**	**1**	**42,779**

Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

SAVINGS FROM ALTERNATIVE GROWTH PATTERNS

Discussion:
The Impact of Alternative Development Patterns on Infrastructure Costs

The costs of infrastructure provision are further refined by attempting to alter development patterns to achieve savings related to the costs of sprawl. This reflects differences in resource consumption and costs of uncontained versus contained development. The first scenario is termed *current*, or *sprawl*, development; the second, *compact* or *managed growth*. These costs are impacted in four different substantive areas: *infrastructure provision, housing costs, land consumption,* and *municipal cost-revenue impacts.*

Differences in cost emerge largely from the use of land. In the first case, under *sprawl development,* land is consumed as if there is unlimited supply and there is little cost in discarding or underusing old land in search of new. This approach to development often takes land in one-half acre or larger parcels to accommodate detached single-family homes and strip nonresidential centers along the outer beltways and spokes from the core of the metropolitan area. Lands are skipped over en route to rural locations as inner-suburban and urban lands are left behind. This pattern is not willful or intentional; it has evolved over time from a mindset that sees no societal consequences for consuming land in this way. New infrastructure is built to accommodate a scattered pattern of low-density land uses without questioning where, or in what sequence, these lands should be developed.

Another approach to land use, which is potentially more conservative in the use of land, infrastructure, and tax dollars, is *compact development* or managed growth. This approach selects land closer to existing development, encourages both infill and redevelopment of core lands, and attempts to refrain from internal development in areas that lack the necessary public facilities and services. When development takes place, natural habitats are buffered, uses are mixed if possible, and both residential and nonresidential uses, even if they exist alone, are clustered. This approach to land use has the potential of mitigating and reducing the impacts of development. It limits overall and fragile land consumption related to development, lowers requirements for road and water/sewer infrastructure and, if done correctly, simultaneously reduces public service costs and local housing prices.

Discussion:
Development Pattern Cost Savings by Category of Infrastructure

The infrastructure, land, housing cost, and municipal cost–revenue savings described above are typical of the findings of similar studies undertaken in Lexington, Kentucky; the Delaware Estuary; and Michigan. The results of these studies are applicable to the State of South Carolina because they have been undertaken in rural and suburbanizing locations. They show the following results for the categories of infrastructure shown above:

NATURAL AND MAN-MADE INFRASTRUCTURE SAVINGS: COMPACT GROWTH OVER CURRENT DEVELOPMENT

Area of Impact	Lexington, KY and Delaware Estuary	Michigan	South Carolina
Developable Land	20.5-24.2%	15.5%	15%
Agricultural Land	18-29%	17.4%	18%
Frail Land	20-27%	20.9%	22%
Infrastructure			
Roads (local)	14.8-19.7%	12.4%	12%
(state)	12-20%	19%	19%
Utilities (water/sewer)	6.7-8.2%	13.7%	13%
Housing/Business Development Costs	2.5-8.4%	6.8%	7%
Cost-Revenue Impacts (Municipal/school)	6.9%	3.5%	5%

Findings: Development Pattern Savings in South Carolina

The savings noted above, applied to the specific areas of infrastructure that they impact (development-related new growth), result in an overall infrastructure savings of approximately 6.3 percent. This amounts to $2.7 billion when applied to a total of $42.8 billion.

The remaining infrastructure need that cannot be addressed by technology or land pattern changes is about $40.1 billion (Figure 5).

These savings are applicable in direct proportion to the infrastructure demand in a region and are possible only if there is a willingness to channel growth in this location. This means containing growth in and around existing regional nodes and limiting growth's spread to undeveloped and underserviced rural areas. Capital facilities are least expensive where they serve the greatest numbers of people or where they can be developed at lower levels of intensity because fewer people use them. There is no free lunch with growth—growth costs! To the degree these costs can be reduced by altering somewhat where people and businesses locate, these changes can be pursued in order to better allocate future infrastructure provision. Infrastructure efficiency definitely has a growth management linkage.

Activities of Other States: Reacting to the Inefficiencies of Sprawl

The current manner in which development is unfolding in South Carolina is unnecessarily expensive to the taxpayer and the environment. Other states have found that excessive costs relating to the pattern and location of development can be avoided by creating infrastructure plans that:

- designate future centers of growth and channel development to both existing growth nodes and newly emerging areas. These plans would encourage infill in already developed areas, discourage development in areas that lack necessary public facilities and services, and lower requirements for road and water/sewer infrastructure construction in all areas.
- establish urban growth boundaries that cluster residential and nonresidential uses in and near areas of existing development. Non-rural centers are also designated.
- delineate areas of special environmental sensitivity. These areas receive less development and are protected against encroachment from other developed or developing areas.
- recognize that nodes of development are planned for in all areas of a state, although at different scales depending upon surrounding levels of development.
- recommend studies to be undertaken to determine the unique regional contribution of each area and to determine its maximum carrying capacity.
- recommend various growth management tools that control the tempo and sequence of development, including planned-unit development, purchase of development rights, transportation corridors, tax increment financing districts, and mixed-use/mixed-type districts.
- designate hierarchical development centers, including required levels of capital facilities for each of these classes of centers.

The study and implementation of these recommendations in other states have reduced the costs of future economic growth. Redirecting just one-half of future growth in the fashion described above could result in savings, to both current and future state residents, of close to $2.7 billion.

Figure 5
SOUTH CAROLINA COST OF SPRAWL SAVINGS (1995-2015) BY SOURCE
(in millions of current dollars)
STATE TOTAL

Service Area	Costs after Initial Savings	Savings from Regional $	Regional %	Local $	Local %	Savings $	Savings %	Final
TRANSPORTATION								
Roads	16,998	1,235	7	471	3	1,706	10	15,292
Bridges	2,413	377	16	9	0	386	16	2,027
Public Transportation	1,022	-	-	-	-	-	-	1,022
Freight (Rail and Road)	246	-	-	-	-	-	-	246
Ports	1,352	-	-	-	-	-	-	1,352
Aviation (Including Air Freight)	576	-	-	-	-	-	-	576
Other Transportation Facilities	16	2	10	0	2	2	12	14
Total	**22,623**	**1,613**	**7**	**481**	**2**	**2,094**	**9**	**20,529**
COMMERCE								
Economic Development	1,355	2	0	0	0	2	0	1,353
Farmland Retention	58	1	2	0	1	1	2	57
Energy	313	-	-	-	-	-	-	313
Telecommunications	1,084	-	-	-	-	-	-	1,084
Total	**2,810**	**3**	**0**	**1**	**0**	**4**	**0**	**2,806**
PUBLIC SAFETY, ADMINISTRATION AND WELFARE								
Public Safety (Jails)	1,004	11	1	21	2	33	3	971
Justice (Courts)	377	3	1	6	2	9	2	368
Public Admin./ Instit./ Hsg.	408	5	1	10	3	15	4	394
Total	**1,789**	**19**	**1**	**38**	**2**	**57**	**3**	**1,732**
EDUCATION								
Public Education	5,028	11	0	101	2	112	2	4,915
Higher Education	2,484	-	-	-	-	-	-	2,484
Total	**7,512**	**11**	**0**	**101**	**1**	**112**	**1**	**7,399**
HEALTH								
Public Health Care	903	-	-	-	-	-	-	903
Water Supply	1,724	5	0	134	8	139	8	1,585
Waste Water Disposal	2,222	47	2	121	5	168	8	2,054
Solid Waste Management	798	-	-	-	-	-	-	798
Total	**5,646**	**52**	**1**	**255**	**5**	**307**	**5**	**5,339**
RECREATION AND CULTURE								
Recreational Facilities	428	-	-	-	-	-	-	428
Arts / Library	342	-	-	-	-	-	-	342
Historic Resources	322	-	-	-	-	-	-	322
Total	**1,092**	**-**	**-**	**-**	**-**	**-**	**-**	**1,092**
ENVIRONMENT								
Storm Water Management	562	16	3	28	5	45	8	518
Shore and River Protection	340	-	-	-	-	-	-	340
Sensitive Land and Water	200	16	8	16	8	32	16	169
Open Space	168	2	1	4	3	6	4	161
Air Pollution	37	-	-	-	-	-	-	37
Total	**1,307**	**34**	**3**	**49**	**4**	**83**	**6**	**1,224**
OVERALL TOTAL	**42,779**	**1,733**	**4**	**924**	**2**	**2,656**	**6**	**40,123**

Note: The percentages in this table are not identical to those listed in figure 1 because the percentages in figure 1 are applied only to the new growth component of costs.
Source: Rutgers CUPR, Wilbur Smith Associates, Siemon, Larsen & Marsh, Sandstone Environmental Associates - Projections, December 1996

FUNDING SOURCES AND REVENUE NEED PROJECTIONS

REVENUE ALTERNATIVES

Discussion: Raising Monies To Pay for Infrastructure

In the 1940s, 1950s, 1960s, and 1970s, a substantial amount of infrastructure was financed with federal and state grants-in-aid in the form of highway funds, sewer and water construction grants, general revenue sharing, and dedicated funding, such as community block grant funds. For a variety of reasons, those funds have been declining for more than a decade and, increasingly, the cost of infrastructure has become a local government financing obligation. While there will continue to be federal and state funding for infrastructure, most experts agree that such funds will be far less than the amounts needed to provide new and replacement facilities necessary to meet a county's, municipality's, or school district's needs.

The infrastructure finance problem is compounded by the fact that many of the facilities financed by federal and state grants-in-aid are nearing the end of their useful lives and are in need of renovation or replacement. Thus, not only do local governments need to fund existing facilities' deficiencies and facilities' needs for new growth and development, but they must also fund replacement costs—all at the same time, and in an environment of increasing revenue constraints.

Discussion: Revenue Raising

The revenue sources available for new infrastructure at the local level are quite varied, but the diverse sources can, in principle, be placed in a few general categories. First, *general revenues* in the form of taxes and fees may be used to finance infrastructure. The most common source at the local level is the *property tax*, but other sources of general revenue might also be used. The money may be used to build infrastructure directly or to pay back bonds that are used to finance it. This mechanism can be used by a subset of taxpayers through special assessments. Second, a *charge* may be levied for a service, such as water provision, and part of the revenue from the charge may be used for infrastructure finance, again either directly or as a revenue source for bond funding. Finally, a *fee* may be levied based on the anticipated cost of providing new service to development. Typically, such fees are accumulated to provide future capacity expansion rather than used to fund bond measures.

Discussion: Financing Revenues

One of the most critical challenges facing local governments as they strive to meet new growth demands is the *financing* of required capital projects. Assuming a city/county council or school board does identify funding sources for a project, they may then face another major impediment—their debt ceiling. This problem is not critical if a project is one that generates revenue to pay for itself, such as a water system. Rather, debt limitations for local governments in South Carolina pertain to general obligation debt, debt that is backed by the full taxing power of the issuing locality. Projects typically funded by incurring this debt include non-revenue generators such as city halls, county courthouses, and school buildings

The local government general obligation debt limitation in South Carolina is the same for cities, counties, and school districts. This "debt ceiling" is equivalent to 8 percent of the assessed value of the taxable property in the jurisdiction. Any general obligation debt

that would exceed the 8 percent limit may be incurred only by a favorable referendum of the voters of a jurisdiction, an action that has become increasingly more difficult to achieve.

In 1989, the SCACIR issued a comprehensive report examining the issue of local government debt and state constraints. The report concluded that high growth areas—such as the state's urban and major tourism counties—found debt limits burdensome as they attempted to reinvest in community facilities to deal with their present and future growth. Most importantly, the Commission concluded that local government debt levels should be limited, but that the demand for new public facilities required that the present constitutional debt limit, and debt issues in general, be reexamined to determine their impact on infrastructure development.

Findings: Revenue Projections Related to Infrastructure Costs

Twenty-year revenue projections for the state of South Carolina indicate that to meet an average of $2.0 billion in annual capital costs, multiple sources would have to be tapped each year for twenty years. About three quarters of infrastructure expenditures can be met with either existing general fund or intergovernmental transfer revenues.

Existing Revenues

Existing sources of state and local revenues are sought to contribute about $0.55 billion annually. They earmark a share of state and local (10 percent) property tax and other revenues specifically for capital spending.

An annual requirement of about $0.91 billion in monies for capital expenditures often comes from federal and state *intergovernmental transfers*. These revenues flow to both state and local governments directly and through the state for local capital projects. A significant grantsmanship effort is also undertaken in several states. This is done to assure that monies being paid to the federal government in the form of citizens' federal income tax are returned to the state (a share for capital expenditures), at least in direct proportion to the share of all citizens' federal income taxes paid. To the degree that funds cannot be secured from these sources, infrastructure provision is accordingly delayed.

Revenue Increases

States requiring infrastructure revenues also seek to increase existing, or establish new, revenues. These often amount to one-quarter of the total. At the state level, a slight increase in the state sales tax, tolling interstate roads, and various forms of user charges (cultural and recreational fees) are paid by those who benefit from services related to major capital improvements. The state gasoline tax is also raised (with a direct local pass-through) to provide for expanded state and local road construction. Road costs typically represent 40 percent of all new infrastructure costs; vehicle users are asked to pay for these costs.

At the local level, local option sales taxes, impact fees, and water/sewer charges are used to raise revenues in areas where state-of-the-art capital facilities are required to benefit specific businesses. County revenues from a state gasoline tax are also a source of local money. A portion of the local property tax is usually dedicated for capital purposes to meet local capital needs and often must be increased slightly.

Activities in Other States: New Revenues for Infrastructure

Existing revenue sources (general fund, other sources, and intergovernmental transfers) together typically bring in about 75 percent of the money required to meet a state's estimated infrastructure needs. Funds in both cases are earmarked for capital purposes. This capital reservation earmarking is at a level of 10 percent for both state and local (county, municipal, and school district) revenues.

At the state level, in other states, additional resources are dedicated for capital infrastructure by:

- Increasing the state gasoline tax (a 1¢ pass-through to counties).
- Increasing the state sales tax rate by 0.5 percent.
- Implementing user fees on major state highways (25¢ on interstate roads every 40 miles in both directions).

At the county and local levels, revenue efforts often include:

- An increase in the local property assessment rate of 0.5 percent, specifically designated for capital purposes.
- Full pass-through to the county of a state gas tax increase (1¢).
- Development impact fees per new residential unit ($2,000) and per 1,000 square feet of nonresidential space ($1,000).
- Water and sewer fee increases per residential and nonresidential unit (typically 10 to15 percent).
- Local option sales taxes expanded to all counties and cities, as opposed to existence in only some of these locations.
- Establishing tax increment financing districts in areas of significant congestion for the specific funding of capital projects.

INFRASTRUCTURE REVENUE RECEIPTS (ANNUAL)

CURRENT BUDGET DEDICATIONS	STATE ($ Billions)	LOCAL ($ Billions)	TOTAL ($ Billions)
State/Local Budgets (10% Earmarked)	0.32900	0.22100	0.54900
Intergovernmental Transfers (Federal to State; State to Local)	0.51300	0.39800	0.91100
INCREASES IN STATE AND LOCAL REVENUES			
Sales Tax (0.5% State; Expand Local Options Tax)	0.15900	0.03000	0.18900
User Charges State: Toll Road (25¢) Local Fees: *Impact* ($2,000 residential/ $1,000 nonresidential) *Water* (10%)	0.06300	0.06800	0.13200
Gasoline Tax (State: 1¢ to County)	–	0.02800	0.02800
Property Tax Assessment (0.5%)	–	0.19900	0.19900
TOTAL	1.06500	0.94500	2.01000

GOALS OF AN INFRASTRUCTURE BUSINESS PLAN

AN INFRASTRUCTURE BUSINESS PLAN

Discussion: Components of an Infrastructure Business Plan

The importance of both short- and long-term infrastructure planning and financing on the overall economic health of and quality of life in the state of South Carolina cannot be overemphasized. It is essential to both the fiscal integrity of the state and the character and quality of future development that a comprehensive effort be undertaken to identify and plan for the financing of future capital needs.

A business infrastructure plan involves the identification of needed improvements along with a short- and long-term plan for financing those improvements. Ideally, infrastructure planning results in a business plan that provides a framework for decision making. Such a plan would address the spectrum of land use issues, including how and where growth will occur and who will pay for the infrastructure necessary to serve new development. The plan must balance the impacts of new development against the impact of existing development.

Taken separately, programming for infrastructure and financing infrastructure are important but somewhat academic exercises. States can plan for infrastructure but if they are not able to fund it, the plans go unrealized. Viewed together, however, the two separate exercises assume new meaning. The key is the interrelationship of infrastructure facilities planning and infrastructure finance planning. By considering these two components as part of one effort, the built environment can be managed much more efficiently.

A business plan for state growth must be implemented by an office of government. This office must be located in a governmental unit that has knowledge about government spending and is instrumental in setting statewide fiscal policy. The plan must include provision for such an office.

Activities of Other States: Business Plans for Infrastructure Assessment

Infrastructure is the skeleton on top of which the built environment grows. It is important that the community know what this framework looks like currently and understand how it is to develop. In an era of government fiscal accountability, communities must operate efficiently, much like CEOs run businesses. A business surely would have a capital planning component in its strategic plan. Current equipment would be well documented, as would future expansion plans. The business plan would include replacement equipment as well as new equipment to allow for expansion. Financing provisions to replace and acquire new equipment would not be left to chance; a well-run business would have a plan in place for careful allocation of its capital. Long-range infrastructure planning in the public context, like long-range capital planning in the business context, requires informed and cost-effective decision making.

A careful assessment of current and future infrastructure needs allows a state to respond in terms of financial resources and directions for growth. By segmenting infrastructure needs into three general tiers—current, near-term, and long-range—priorities begin to take shape. Admittedly, the more distant the forecast, the less reliable it is likely to be. Nevertheless, for planning purposes, such projections provide, at the very

least, a reference point for various development and funding scenarios.

The critical point is that if annual decisions are made without a long-range plan, money inevitably will be diverted to the issue or crisis of the moment. Long-range infrastructure planning and budgeting can help avoid these crises.

The advantages of a business infrastructure plan:

- First, it creates a more predictable environment for public and private investment and avoids unrealistic expectations about the timing of development and level of service for needed facilities. If the private sector understands when facilities will be available to serve a particular area, the risk inherent in private-sector investment decisions in those areas and disappointments can be reduced if not avoided.
- Second, an infrastructure business plan ensures discipline in public-sector decisions. Each year, elected officials are challenged to allocate scarce financial resources to competing interests. In the absence of such a plan, there is a natural tendency to make budget decisions on the basis of political pressures of the moment, with the result that less pressing but equally important improvements are overlooked.
- Third, infrastructure is provided to existing and planned future development in a manner that makes sense not only from a planning perspective but from a fiscal perspective as well. Too often, communities allow additional development to occur and build public facilities afterwards.

Activities of Other States: An Administrative Structure

No business plan can be implemented nor can meaningful priorities be set or regional service economies ensue without an appropriate administrative body to make decisions that will benefit all. A central capital planning office is often established within the treasury department or budget office of the state. This department serves as a central authority and coordinating body and is responsible for establishing an infrastructure prioritizing process.

The central capital planning office acts in an advisory role to assist local and regional planning agencies. It typically has its own executive director who reports to a financial head within the executive branch of government.

The central capital planning office relies on growth projections provided by the data centers of the various states and is responsible for preparing and updating regular infrastructure needs assessments. It also is responsible for projecting revenue returns related to current and future growth, and coordinating these projections with projections of future infrastructure costs. This office then recommends how existing revenues are to be tapped and new revenues brought on line to help close any shortfalls between infrastructure costs and infrastructure revenues. The central capital planning office is further responsible for determining where revenues are raised, that is, at the state or local level, and recommending a menu of revenue alternatives at each level, with appropriate projections to achieve the intended funding requirements.

The central capital planning office is also responsible for pursuing studies

that recommend specific ways to eliminate duplication and fragmentation among existing state and local agencies. It further makes recommendations for changes in legislation and regulations to make the state's overall infrastructure delivery process more coordinated and effective.

Activities of Other States: Integrated Systems of Revenues

Once an infrastructure plan has been developed and an administrative body established to prioritize and recommend infrastructure projects, serious "number pushing" ensues to design an array of revenues appropriate to the infrastructure support task. While it is the central capital planning office's responsibility to recommend revenue alternatives, often studies are "contracted out" to local universities and consultants to determine who should pay (existing or future residents) and via what means (taxes, user charges, and the like).

The advantages of an infrastructure financing program are evident in an era of careful fiscal responsibility. First, decisions regarding incurring debt require a long-range perspective due to the length of repayment periods. What may seem like a beneficial decision to meet an immediate need may not be justifiable in the face of a long-squeeze on capital.

Second, experience shows that community support for revenue increases is linked directly to perceived confidence about the benefits that will be forthcoming. The more clearly the benefits of a proposed program of public investment are communicated to the public, the more likely the public will support their funding. In addition, an established schedule of improvements makes it easier for residents in one region to understand that while monies are being committed today in other parts of the state, their area will be in line for future funding.

Finally, looking at the entirety of what has to be done tends to be much more resource-efficient than approaching development incrementally.

Activities of Other States: Balancing Efficiency and Equity

The central capital planning office often has to decide *where* infrastructure will be developed. These decisions benefit from the advisory support of an independent advisory committee to the central capital planning office. The advisory committee, which often comprises regional representatives, allows consensus building between statewide and regional assessments of infrastructure need. The purpose of the committee is solely to advise; it does not overrule the central capital planning office's decisions.

In pursuit of its charge, the central capital planning office comes to grips with which areas will or will not receive certain types of infrastructure. These decisions are based on both *statewide* priorities and overall efficiency (say, 75 percent) yet must not ignore local needs that may occasionally conflict with statewide efficiency.

The equity of allowing infrastructure to be placed in certain areas that need economic sustenance also enters into the equation (perhaps 25%). On the one hand, counties that require occasional "jump starting" have to receive their share of attention, even though this might appear to detract from overall efficiency. In the final analysis, the central capital planning office has been charged with putting infrastructure in areas where it will do the most good for the citizens of the state as a whole.

EDUCATION NEEDS AND THE EDUCATION PROCESS

THE NEED FOR EDUCATION

Discussion:
Why the Need for Education As It Relates to Infrastructure Provision?

At the heart of the challenge of infrastructure finance is a lack of general understanding regarding the relationship between the availability of infrastructure and the level of a community's quality of life and practically *no* understanding of the cost of infrastructure and the sources of revenue on which infrastructure depends. A key element of a successful infrastructure finance program is educating the public and its appointed, employed, and elected officials about the nature of infrastructure and the cost of maintaining and improving it.

Unfortunately, infrastructure is not a particularly exciting subject to the average citizen. Except for those occasions when the sewer backs up or when water pressure drops, infrastructure is one of those topics which "someone else" should pay attention to. As a result, it is unlikely that the medium of the moment—the TV sound bite—will play a significant role in a successful education program. Other media, such as brochures and pamphlets, are more likely to be the foundation of a successful infrastructure education program.

It is often the responsibility of the central capital planning office to initiate the educational program. The central capital planning office understands what the needs are and how best to approach the program.

First and foremost, the general public must be educated if it is expected to support significant infrastructure initiatives. Historically, infrastructure finance initiatives around the country do not succeed unless the public understands the nature of capital facilities' supply and demand relationship. It is easy to blame growth for traffic congestion, for example; however, as discussed above, traffic congestion is the result of a whole host of forces, including increased travel by existing residents. The problem is that the general public has little interest in infrastructure matters except when fees or taxes are increased or when the level of service declines to a point that is unacceptable. At that point, the public is not receptive to being educated.

What is needed is a deliberate program of educational building blocks. These begin with simple concepts—for example, waste stream separation as a way of improving the cost effectiveness of solid waste disposal. From there, one can move to the more complex interrelationships that characterize traffic congestion. It takes time and deliberation to debunk the myths of infrastructure, and it requires that school-age children, their parents, and *all* segments of the community be exposed to the basic concepts that underlie the infrastructure equation.

Activities of Other States: The Use of Pamphlets, Papers, and Other Informational Materials To Get the Word Out

To the extent that local media—print or television—can be induced to address the infrastructure issue, a newspaper series on infrastructure and quality of life has proven to be very effective, as are local documentaries that compare qualities of life in communities with effective infrastructure planning and

finance programs and those that lack such programs.

The education of the general public is also the first step in the education of its elected officials. Experience shows that it takes more than an enlightened public to achieve infrastructure finance objectives. Elected and appointed officials also need to be educated so that they can disregard the "heat" generated by infrastructure and land use debates and focus on the difficult choices that confront them. Brochures, pamphlets, and guides to infrastructure needs and finance are all useful tools for educating elected officials about the direct and indirect effects of public policy decision making. Symposia are another effective means of educating elected and appointed officials. These officials find comfort in hearing about the experience of others with similar obligations and responsibilities, and symposia are a meaningful opportunity for that kind of exchange. Moreover, symposia present a non-adversarial venue for elected and appointed officials to interact with their staff and constituents outside the context of a particular issue.

Activities of Other States: Establishing Speakers Bureaus

Effective educational programs often comprise "speakers bureaus," which maintain rosters of available experts. A group that has heard about a particular infrastructure issue secures a knowledgeable speaker from the bureau to participate in a regular or special hearing. There are numerous examples around the country of speakers bureaus that played important parts in successful programs of community awareness. The speakers are often supported with materials for distribution and with illustrative graphics (in various media) to respond to different questions in various settings.

Activities of Other States: Creating a Business Leaders Program

One of the shortcomings of the local government public hearing process is that it tends to be driven by people who have a narrow special interest in a particular topic being considered. One way of educating the general public and its elected representatives is an active program of public participation by business and other leaders to ensure that a more comprehensive perspective is presented during public hearings.

Forums where representatives from business, conservation, and other fields come together to ensure that consideration of current, near-term, mid-term and long-term infrastructure needs are not lost in the passions of the moment of a particular issue have had a dramatic impact on the infrastructure debate. The participation of business leaders in public discussions on infrastructure often shift the paradigm from benign neglect to deliberate consideration. In the traditional model, the real estate development industry—which has a clear self-interest in the subject—has been the principal advocate for infrastructure changes, even though the entire business community is highly dependent on adequate public facilities. An initiative which makes clear to the general public and appointed and elected officials that the adequacy of public facilities is an important issue to the entire community is a significant initial step in reforming the process of infrastructure provision.

Activities of Other States: Holding Regular Symposia

Other states have wrestled with the very same infrastructure issues that confront South Carolina. One way to learn from

mistakes and to create positive momentum is to convene one or more symposia where experienced individuals come to the region and share their views with the community. Symposia serve not only as educational opportunities but also as motivational experiences. Learning that Oregon, for example, has found a way to meet its long-term capital facilities needs provides comfort and cover for those in the state who are willing to engage in change. Most people, for example, believe that infrastructure referenda, like other referenda involving increased taxes, are not very successful. The fact is that most infrastructure referenda are successful—provided that certain key program elements are present. Bringing together the people who have succeeded in establishing infrastructure as a prime consideration in their home territory offers an opportunity for the region to learn from others and to avoid repeating mistakes.

Activities of Other States: Preparing the Infrastructure Education Message

1. Informing people of infrastructure and infrastructure needs.
   States are:
   - exposing them to the relationship between infrastructure and quality of life.
   - making them aware of the enormity of, and reasons for, infrastructure need.
   - explaining the typical infrastructure revenue shortfall.
   - providing access to meaningful information about infrastructure via the Internet.
2. The alternatives available.
   States are:
   - becoming more efficient in the provision of infrastructure;
   - devoting more resources to infrastructure provision;
   - deferring needed infrastructure investment;
   - combining of the above; or
   - doing nothing and deferring the problem.
3. Indicating that decisions will be difficult, but necessary.
   States are:
   - describing the new infrastructure initiative.
   - explaining how the state will benefit from it.

AN INFRASTRUCTURE BUSINESS PLAN: MAKING THE PLAN WORK

AN INFRASTRUCTURE BUSINESS PLAN

Discussion:
How to Get A Business Plan Going

Unfortunately, most plans—comprehensive plans, special area plans, and even business plans—are often relegated to a shelf in a closet in some staff office. To be blunt: A plan without implementation is no plan at all. In order to implement the objectives of this report, it is necessary to establish a series of strategic action plans:

- a short-term plan for year one;
- a mid-term plan for years two and three; and
- a long-term plan for years four and five.

Activities of Other States:
Preparing Short-term Plans

Three general initiatives are often undertaken as a part of a short-term plan: (1) establish a central capital planning office; (2) initiate a comprehensive public education program; and (3) analyze alternative funding mechanisms.

1. The Central Capital Planning Office

A central capital planning office is often established within the executive branch of government in one of the financial departments. The duties and staffing levels of this office are specified and appropriate legislation drafted for its creation. A central capital planning office often operates in parallel to a government advisory agency. In South Carolina, this would be the Advisory Commission on Intergovernmental Relations. The purpose of these two agencies is frequently sufficiently similar—the delivery of government and its services in the most efficient ways—that they could easily operate as one or as partners. This is usually a critical move in the overall process of delivering capital goods more effectively.

2. An Education Program

Soon after the establishment of a central capital planning office, this office—together with other interested and affected groups—typically commences a six-month public education program on a topic such as the relationship between infrastructure and quality of life. The public education effort is often comprised of four elements:

1. pamphlets, papers and other informational materials
2. a speakers bureau
3. a business leaders program
4. one or more symposia on infrastructure and quality of life

2a. Pamphlets, Papers and Other Informational Materials

The first medium of communication is written material that sets out the essential elements of the infrastructure equation. The material, often distributed by the central capital planning office, is presented in an easily understandable format and typically includes a contact for additional information. These materials take any of several different forms, from pocket size, to foldouts, to 8 1/2 x 11 brochures. The materials are published in quantity and made readily available throughout the region. They are prepared and disseminated over time with each document presenting a simple proposition, like "The Truth About Traffic" or "There's No Free Lunch." Other entities, including local governments, are encouraged to co-

sponsor the distribution of materials with the central capital planning office. School sites are sought as places of dissemination, as a means of reaching families who are not normally involved in land use and infrastructure debates.

2b. Speakers Bureau

Speakers bureaus with participants from diverse fields throughout states are also often established. Speakers are supported with written speeches (in full text and outline form), informational materials, and presentation graphics. The availability of speakers is advertised with direct mailings and public information announcements in the local media.

2c. Business Leaders Program

An infrastructure "strike team" of business leaders is also often established to provide speakers at public meetings, where matters that directly or indirectly affect infrastructure or infrastructure finance are discussed. These participants typically focus on the "big picture" and concentrate on the implications of the proposed action on long-term capital needs. These participants usually represent a broad spectrum of economic development interests and tend to elevate the discussion above the immediate concerns of special interests to ensure that all perspectives—individual and cumulative—are fairly presented.

2d. Symposia

Symposia are held during the first year after recognition of the infrastructure report. Symposia are held in central locations with sufficient seating to accommodate significant numbers of people. Symposia focus on the relationship between infrastructure and quality of life and on infrastructure need and financing. Symposia are often noticed through invitation lists; however, invitations are usually extended to diverse groups of public- and private-sector interests. Symposia often feature nationally recognized keynote speakers and emphasize on practice as opposed to theory. In other words, the symposia faculty often comprise practitioners rather than academics.

3. Alternative Funding and Management Mechanisms Analysis Initiative

Many of the alternative funding and management mechanisms that are appropriate for implementation require further legal and administrative review. For example, the question of whether an optional hotel/motel tax is a sales tax or a privilege tax defines the utility of this funding alternative as a regional infrastructure funding device. It often matters not how the issue is resolved—by legal opinion, a request for an attorney general's opinion, or some other means—only that is resolved before the mid-term action plan is implemented.

MILESTONES (Typical Activities):

Year 1 (first six months)

- Creating the central capital planning office
- Publishing two infrastructure educational documents
- Conducting a symposium on the relationship between infrastructure and quality of life
- Establishing a speakers bureau

- Forming an infrastructure support "strike force" of business leaders

Year 1 (second six months)
- Publishing two infrastructure educational documents
- Conducting a symposium on alternative methods of financing and managing infrastructure

Activities of Other States: Preparing Mid-term Plans

The mid-term plan frequently represents the transition from education and analysis to implementation. This is the time to establish credibility and create momentum. To this end, initial implementation programs are selected to avoid unnecessary risk; they also are chosen because of their visibility. A frequent alternative that emerges from initial analyses is the consolidation of water and sewer facilities in a region; if no opposition arises, it is often moved forward.

The mid-term plan typically involves the implementation of at least one major program each year during the second and third years after acceptance of the infrastructure report. The programs selected for implementation, to the greatest extent practical, avoid highly controversial issues and focus on programs that both improve efficiency and address politically popular subjects.

MILESTONES (Typical Activities):

Year 2
- Preparing and executing a regional intergovernmental agreement with regard to infrastructure delivery or management

Year 3
- Completing a public–private partnership in infrastructure finance

Activities of Other States: Preparing Long-term Plans

The long-term action plan is often predicated on the research and education of the short-term action plan, the credibility and momentum established under the mid-term action plan, and is a point of major risk-taking. It is at this juncture that major initiatives involving complex and controversial initiatives are addressed, including a statewide infrastructure prioritization initiative together with a statewide transportation infrastructure finance element, such as a statewide gas tax increase or a significant user charge for regular transportation facilities usage.

MILESTONES (Typical Activities):

Year 4
- Implementing a new statewide infrastructure finance or management program

Year 5
- Implementing an additional statewide infrastructure finance or management program

CONCLUSION

Infrastructure is an important and difficult issue to deal with at the state level. The need is large, and invariably revenues must be tapped that cut to the quick in terms of local finance options. The reality, however, is that without infrastructure development it is difficult to move forward and accept future growth. Systems become overburdened and break down, and the state is rendered to a point of disadvantage from which it cannot return.

States have come to grips with this reality by either slowing the pace of growth so that capital facilities are available and in place (concurrency) or funding capital facilities at a pace equal to projected growth (capital facilities provision). Whichever course of direction is chosen, one that *cannot* be followed is to allow the pace of growth to continue but provide little in additional capital facilities.

SECTION VI

SOURCES OF INFRASTRUCTURE INFORMATION

SOURCES OF INFRASTRUCTURE INFORMATION

SOURCES OF INFRASTRUCTURE INFORMATION

TRANSPORTATION

Aviation (Including Air Freight)

History of Grants Awarded in the Appalachian Region with which the Appalachian Council of Governments Assisted in Developing or Administering, 1965-1995. Appalachian Council of Governments. Undated.

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